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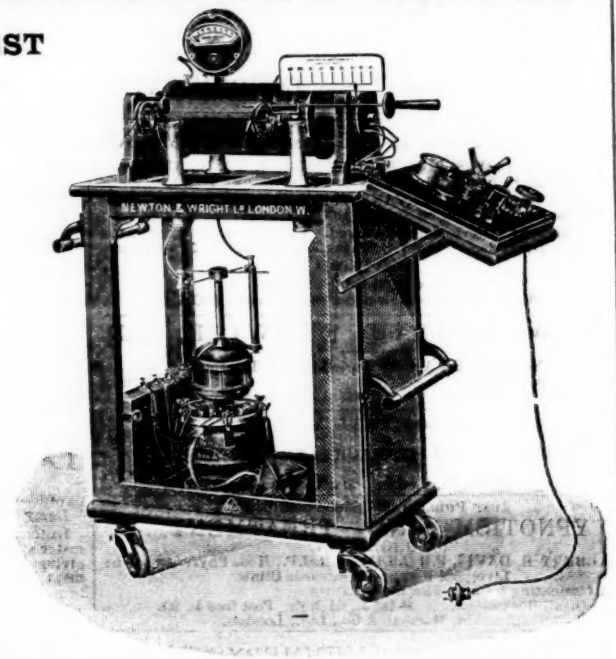

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Syphilis is a chronic relapsing spirillosis with periods of prolonged latency. Its physical signs are the tissue response to the successive waves of spirochætal attack upon tissues of ever-decreasing resistance. The spirochæte invades in time every tissue of the body and is recoverable from every lesion. It probably persists longest in the perivascular connective tissue of the small blood-vessels, in lyphatics, perineural sheaths, and in bony canals. Pathologically, syphilis is a granuloma characterised by an obliterating endarteritis. The blood serum of syphilitic patients, and in many cases their spinal fluid, will in the presence of an alcoholic solution of lecithin and cholesterol deviate complement.

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The dose is estimated according to the body weight as being 1 cg. per kg. It is advisable to begin with a small dose, 0·45 g. in men and 0·3 g. in women. It is given to the patient fasting, on an empty bowel, preferably in the evening, and no food is to be taken until the next morning. The ideal administration is intravenous, in small concentrated solutions of 2 to 5 c.cm. It is given by a Record syringe through a short, sharp-pointed needle, having a slightly concave bevelled edge. It is essential that each dose be freshly prepared with cold, sterile, recently distilled water, and given within a few moments of its solution. This technique is easily acquired, and renders one independent of assistance or of complicated paraphernalia. Given thus it is less slowly excreted, and there is freedom from lung complications and water reactions.

Another method is to administer the drug by gravity in massive dilution, the injection being preceded and followed by normal saline. This is safer for beginners, but requires time and an assistant, and lung complications, rigors, and fever are more likely. In my opinion it is not suitable for ambulant cases, and is not so effectively sterilising on account of the more rapid excretion.

The method of the future will be some perfected form of intramuscular administration. At present this method is not free from pain, but the better clinical results and simple technique are bound to widen the field of its applicability. The rectal method has nothing to commend it, and the spirochætocidal effect is negligible.

Intravenous administration of the arsenical compounds is accompanied by a slight fall of blood pressure, probably due to the general, but transient, vaso-dilator action of the drug. There is an appreciable leucocytosis and some diminution in the red blood cell count. The capillary changes are marked, and in fatal cases death is due to capillary hæmorrhages and accompanying serous exudation, and not, as formerly believed, to liberation of endotoxins from dead spirochætes.

The drug disappears from the blood in a few hours; traces may be detected in the urine up to ten days, but arsenic can be found in the organs after many months, especially in the liver. Excretion is largely by the bowel and much less by the kidney, a reason for previous knowledge of the state of these organs. Probably the therapeutic effect is only exerted during the short time the drug is circulating in the blood stream. If this could be proven it would guide us to a better method by smaller doses at shorter intervals, but maintaining a strict watch upon the total amount of arsenic given.

Reactions.

The administration of the "606" and "914" compounds may be accompanied by many minor but troublesome reactions, ranging from syncope and evanescent vaso-motor disturbances to the graver disturbances known as the nitrotoid crises at the time of injection; to rigors, fever, lung, gastro-intestinal, and skin reactions upon the succeeding day; and with excessive rarity to the alarming phenomena of jaundice, nephritis, and encephalitis at remoter periods.

The syncope is anticipated by the dorsal posture; vaso-motor disturbances are avoided by the previous intramuscular injection of 2 c.cm. of 1:1000 adrenalin. Rigors and fever are commoner after administration of massive dilutions and are explicable as water phenomena. Certain cases react similarly after concentrated injections, and are (probably rightly) explained as due to the release of endotoxins owing to spirochæticidal action, as the phenomena most frequently follow the first injection. For the graver complications following intravenous medication phlebotomy may be done with great success if deemed advisable.

Gastro-intestinal disturbances are not often seen with the concentrated method, and can be obviated by proper preparation of the patient. The skin lesions are usually of the anglo-neurotic type and are transitory. Novarsenobillon does

not tend to cause dermatitis; should this occur, however, it will require eliminative treatment, the administration of ichthyol, the use of bran baths, and all the care of the dermatologist. It is a stubborn complication and will bar further arsenical treatment.

Local reaction at the site of injection is due to careless administration, and is more severe with drugs of the "606" than of the "914" type. The drug is introduced either over or under the vein; a very painful swelling appears, followed the next day by a marked cellulitis and in a few days by the slow separation of a deep grey slough; an ulcer is left which is slow to heal. Minor local results are extreme pain at the moment of puncture, probably due to striking a nerve filament, and venous thrombosis due to excessive alkalinity of the injected fluid or to irritation of the endothelial lining of the vein by unnecessary manipulation of the needle.

Results of Treatment.

The first injection of an arsenical compound is apt to be followed by an immediate but transitory exacerbation of all the syphilitic manifestations—of primary sore, intensification of rash, and increased Wassermann reaction. It has been noticed to a less degree in mercurial administrations, and was regarded as a favourable sign. It would appear to be due to a non-spirochæticidal dose, which stimulates the parasite to increased activity, or, in the view of others, to the liberation of endotoxins. It is not a contraindication to further treatment, but it is not a desirable phenomenon to provoke in untreated secondary syphilitics, those with cerebro-spinal manifestations, or sufferers from laryngeal syphilis. It may be obviated in these cases by the previous intensive administration of mercury.

This reaction, termed the Jarisch-Herxheimer reaction, is used for diagnostic purposes in latent syphilitics or in those resting after a period of intensive medication. A small provocative injection is given and the blood tested at three-day intervals for three weeks for a positive Wassermann. It usually becomes positive by the seventh day.

The effects of injection of the arsenical compounds are most striking. The spirochætes are destroyed with varying rapidity, depending upon their accessibility by the blood stream, skin and mucous membrane lesions being first affected, the chancre more slowly, and slowest those in the perineural lymphatics and meninges. It is doubtful if spirochætes in the nervous parenchyma are ever reached by intravenous injection of "606." The spirochætes in a primary sore are profoundly affected in 24 hours and the chancre markedly modified in 14 days. Within the glands and the skin lesions the spirochætes disappear within three days to a week; cutaneous lesions, except the small papular syphilide, fade within a week. Syphilitic headache, although present for weeks, will often disappear overnight. Iritis improves at once and may clear up within three weeks. Cutaneous gummata respond most favourably. Marked improvement is evidenced by gain in weight and a sense of well-being.

MERCURIAL TREATMENT.

The ease of administration, simplicity of control, the certain though slow results render mercury the ideal drug to supplement and complete a course of intensive arsenical treatment. It is more rapidly excreted, and must be given in small, oft-repeated doses.

Mercury may be given intravenously in cases where the arsenical derivatives are contraindicated—e.g., syphilitic hemiplegia. The preparation used is 1 c.cm. of a 1 per cent. solution of the cyanide of mercury in sterile distilled water. The injections may be given daily for two weeks. This is the most rapid and certain but most dangerous method, and requires a careful watch for toxic symptoms—hæmorrhagic colitis, nephritis, and stomatitis. The mercury is excreted in the urine within six hours.

Attempts have been made to form a mercurial compound on lines corresponding to the arsenical syntheses, but so far without pronounced success. Colloidal preparations are only feebly active, and are by no means free from the possibility of mercurial poisoning.

Intramuscular injection is most widely used, and is with advantage combined with intravenous arsenical treatment. Soluble solutions, such as the perchloride, benzoate, or succinimide of mercury, are to be preferred when rapid action is desired. For sustained effect they need to be injected daily. It is possible by this means to reach rapidly a point of mercurial intolerance, but the danger of mercurial accumulation at the site of injection does not exist.

Insoluble injections—metallic mercury, calomel, salicylate of mercury—are given in an oily suspension. They may remain for weeks at the site of injection, constituting a "mercury reserve." Mercurial intolerance in these preparations, should it occur, is less under control and more difficult of treatment. Metallic mercury is perhaps the best, and although not so rapidly efficacious as calomel is less painful and the results more lasting. The salicylate preparations are of indifferent merit. Calomel injections, although painful, are most useful in tertiary lesions. Insoluble preparations only demand a weekly administration. It is advisable that courses of insoluble injections be spaced to avoid mercurial accumulation.

Properly performed, *inunction* gives incomparably the best results, but its application is limited.

Calomel fumigation is uncertain, unpleasant, and troublesome, and except in some persistent tertiary skin lesions has a very limited field.

Mercury by the mouth has had the sanction of a past generation. Its slowness and uncertainty make it less suitable in the earlier stages, when time is valuable; but it is the sine qua non after the intensive and interrupted courses of intravenous and intramuscular medication. It should be given as Hutchinson's pill over the period of a year.

Iodine is the ally of mercury. Although in itself without effect upon the spirochæte it is increasingly useful in syphilis with the age of the infection. In tertiary manifestations, given as the old "mixed treatment," its benefits are known to all. Iodide of potash alone has an almost specific action in hastening the absorption of the syphilitic granuloma. It should be used with caution in syphilitic laryngitis, as it may precipitate a local œdema. Given in the form of collo ol iodine, in amounts of 100 c.cm., as a forerunner of an intravenous injection of an arsenical derivative it would appear to hasten the destruction of the spirochæte.

WASSERMANN REACTION.

The applicability of laboratory research to clinical practice is nowhere more brilliantly evidenced than in syphilis. It is, however, an irony that the test so widely used in the diagnosis, control, and prognosis of syphilis is based upon a fallacy. The reaction should be regarded as a symptom of the disease rather than a pathognomonic phenomenon. These remarks are by no means a slight upon its proven value, and the application of the test to many mental and nervous diseases has enhanced our appreciation of the widespread sequelæ of spirochætal infection.

In no sense is the test a qualitative one. It is strictly quantitative and requires careful controls of all reagents. In its performance there are many possibilities of error, both in regard to antigen and complement, hæmolytic system, and patient's serum or cerebro-spinal fluid. The final interpretation depends upon the absence or presence of hæmolysis in the hæmolytic system, and there are four possible degrees of expression of this hæmolysis. It may be absolutely negative, more nearly negative than positive, weakly positive, and strongly positive. It is influenced markedly by the presence in the blood serum of antisyphilitic drugs, which will produce a negative reaction, even in the presence of active lesions.

The reaction is not present in primary syphilis until the third week of the chancre; in secondary manifestations it is present in 90 per cent. of cases; in tertiary lesions in 70 per cent. Parasyphilitic conditions show the test in 90 per cent., and in these cases of parenchymatous nervous syphilis the spinal fluid is positive in 100 per cent. In the dormant stages of syphilitic infection, when host and parasite are in equilibrium, the test is only positive in some 20 per cent. of cases. A negative reaction, therefore, does not exclude syphilis, but a repeatedly negative reaction, after provocative injection, is strongly presumptive evidence of its absence. Similarly, a repeatedly negative reaction after a lapse of time following adequate treatment is strongly suggestive of cure, more especially so if after a provocative injection.

As to its significance, due consideration must be given to the age of the infection, the manifestations present, the amount of treatment given, the probability of arsenical or mercurial compounds being present in the blood, and the result of previous tests. In spinal fluids the reaction must be considered in conjunction with the peculiarities of pressure, the cell count, and the globulin reactions. The

reaction may also be obtained in yaws and relapsing fever, and, questionably, in leprosy and malaria.

Noguchi's cutaneous reaction is the skin response to an intradermal injection of comminuted sterile cultures of *Treponema pallidum*. A positive reaction is evidenced by a small red papule at the site of injection by the third day. This persists for about two weeks and may become pustular. The reaction is more certainly obtained as the infection ages, and may be of value in the latent stages, in tertiary affections, and in congenital syphilitics. Its value is marred to some degree by the fact that the reaction is enhanced by the presence of the iodides. It is in no sense a rival to the Wassermann reaction.

General Treatment.

Syphilitics are in civil life difficult to keep under observation. Many after a short course of treatment are seen no more until a recrudescence appears. This question (of following up) is seriously occupying the attention of those engaged in venereal clinics. It is well to devote pains to bringing the patient to a just appreciation of the need for early, vigorous, and continued treatment. In doing so we must encourage him in the very reasonable expectation of cure.

Before beginning a course of treatment the patient should be thoroughly inspected and his urine examined. Directions should be given as to diet and a caution against foodstuffs liable to cause gastro-intestinal disturbances. Abstinence should be enjoined. Tobacco, except in mouth and throat affections, need not be interdicted. All septic stumps should be extracted, carious teeth filled, and the buccal cavity made and kept as clean as may be. This done, the daily use of a weak peroxide mouth-wash and a soft toothbrush suffice to prevent stomatitis. Mercurial stomatitis is primarily a septic condition and is avoidable. Its appearance calls for cessation of mercury, saline purgation, peroxide mouth-washes, and administration of chlorate of potash. Severe cases may rapidly become edentulous.

Inquiry is made as to any tendencies to urticarial or eczematous rashes. A weight-card is kept; loss of weight is a bad sign and, as a rule, calls for a change of treatment. Syphilis causes a marked secondary anæmia; hæmatinics may be given between mercurial courses; Easton's syrup is most serviceable. Malnutrition may call for cod-liver oil; these conditions are now less frequent, and gain in weight is not uncommon under the metabolic stimulation of the arsenical compound. A monthly record of the Wassermann should be kept for the surgeon's reference; in many cases it is inadvisable for the patient to know the result, as he may draw erroneous conclusions.

What Precautions should be Observed?

Many of the earlier disturbances ascribed to the arsenical compounds are now known to be due to errors of technique and treatment, and experience has justified a greater confidence in their administration to almost every class of patient. Hæmophilia, advanced hepatic disease, and conditions of persistently low blood pressure definitely forbid arsenical medication, as do also diabetes, dyspnœa, aneurysm, and extreme age. Renal disease, as evidenced by marked albuminuria and casts, calls for caution, and is perhaps a greater bar to mercury than arsenic, more especially in the pregnant. Arsenical treatment may also cause unpleasant sequelæ in eczematous, seborrhœic, and urticarial patients.

A Jarisch Herxheimer reaction in any important organ the seat of syphilitic disease, such as a gummatous larynx or brain, a syphilitic hemiplegia or a diseased organ of special sense, might be disastrous; in such cases an intensive course of mercury should precede the cautious intravenous administration of arsenic.

A single negative Wassermann is no evidence of the absence of spirochætal infection; and a positive reaction does not imply that the particular lesion before us is specific—a warning of some value in affections of the tongue, lip, penis, and vulva. Carcinoma occurs in these localities with sufficient frequency in syphilitic patients as almost to justify their classification as "episyphilitic." Carcinoma of the tongue, indeed, would almost appear to be the epilogue of an unspoken pathological drama in which the prologue was syphilis.

Syphilis is a great mimic, and prepares many a pit'all for the unwary, especially in its later congenital manifestations. Many a suspected "lupus patch" and many a "sarcoma" has been found to disappear under appropriate antiluetic treatment. It has well been said by Osler, "Know syphilis, and all things clinical shall be added unto you."

Cases with Primary Sore.

Cases of venereal disease fall for treatment into certain easily granted clinical groups: (1) Those presenting with a primary sore; (2) those with skin, mucous membrane, and systemic reactions; (3) neuro-recurrences; (4) presenting tertiary phenomena; (5) cerebro-spinal syphilis; (6) parasyphilitics; (7) the pregnant syphilitic; (8) congenital syphilis.

I regard the early recognition and immediate treatment of a primary sore as one of the most urgent duties of practice. A week lost at this stage is a year lost to the patient. To withhold one's hand because the spirochæte is not immediately demonstrable, to await the moral support of the positive Wassermann, or to allow the appearance of skin, mucous membrane, or systemic reaction to occur is to lose the therapeutic initiative. Arsenical medication will always control the lesions, but it is early and vigorous treatment which holds the promise of cure.

In most cases the history of exposure, the story of the evolution of the lesion, the superficial ulceration, the raised, clean-cut edge, the glazed appearance, and the glandular enlargement will make diagnosis easy. Genital herpes is seldom a source of confusion in diagnosis. The diagnosis is confirmed by the demonstration of the organism, either by Giemsa's stain, the China ink method, or by dark-ground illumination. If the serous exudate gives no information it is quite a legitimate procedure to aspirate the nearest enlarged lymphatic gland. Negative laboratory findings by no means exclude syphilis, and it is a cardinal error in this stage to rely upon the pathologist's report to the prejudice of one's clinical judgment.

Treatment in Early Primary Stage.

The sore should, if possible, be excised or cauterised, but this in no wise affects the progress of the infection, for by the time the glands are enlarged this infection is systemic. Excluding excision, the sore should be treated by mercurial antiseptics or the local injection of hectine. A small dose of potassium iodide will hasten absorption, if given in conjunction with the arsenical compound.

The recognition of a primary sore is the signal for an intravenous injection of one of the arsenical compounds. This is followed in many cases by a local intensity of the primary lesion, which is of no clinical consequence and quickly subsides. Coincidently with this injection an intramuscular injection of a soluble preparation of mercury is given, and is repeated at three-day intervals, a careful watch being kept for symptoms of mercurial intolerance. The arsenical course should extend over 14 weeks, full doses being given. In the last seven weeks of this course an insoluble mercurial preparation replaces the soluble one, and is given coincidently with the weekly injection.

At the conclusion of this course it is the custom to place the patient upon Hutchinson's pill in such a combination of grey powder and Dover's powder as experiment shall determine suitable. This pill is taken three times daily for 10 weeks. On the twenty-fourth week of treatment a second course of seven weeks' intravenous or intramuscular medication is instituted, a different arsenical compound being selected and given in smaller doses. This course is now followed by seven weekly muscular injections of mercurial cream, at the conclusion of which the Hutchinson's pill is taken in intermittent courses until a year has elapsed.

If this treatment be instituted immediately upon the recognition of a primary sore, and before the appearance of a Wassermann reaction, it is possible to promise the patient freedom from secondary symptoms, freedom from the danger of conveying infection, freedom from the risk of neuro-recurrences, and the very justifiable hope of a complete cure. It is necessary to keep the patient under observation for two years, and the clinical course is controlled by laboratory tests. It would be a praiseworthy precaution if the patient could be persuaded to continue his mercurial treatment during the second year in repeated intensive courses.

The leisured classes will better be subjected to the mercurial course by inunction, if the untiring services of a skilled rubber are available

CASES IN SECONDARY STAGE.

It is not always the patient's good fortune to present for treatment in his early primary stage, and by the time the Wassermann reaction has appeared the infection is already diffused and the patient has forfeited his best hopes of cure, and will soon commence to show those varying tissue responses which constitute the secondary stage.

The manner of attack in secondary specific infection calls for caution, especially with increasing age of infection. Treatment is initiated by intramuscular injection of the soluble mercurial repeated at three-day intervals. It is impossible to gauge clinically the exact extent of the specific activity, and this obviates Jarisch-Herxheimer reactions, which may evidence themselves by cranial nerve paralyses within a few days of arsenical injection. If visceral or arterial disease is suspected the mercurial should be long-continued and preferably combined with the iodide. If the need be urgent intravenous mercurial injections may be employed.

Upon the commencement of the arsenicals the soluble mercurials are replaced with advantage by metallic mercury, and injections of mercurial cream should be continued at weekly intervals for 30 weeks. Two courses of arsenicals are given, of 14 and 7 weeks' duration respectively, at weekly intervals and with a period of 10 weeks between. The importance of mercurial treatment cannot be over-estimated, and short intensive courses of eight weekly injections must be given during a period of two years from the beginning of treatment.

The lesions respond rapidly to the arsenical derivatives. The small indurated papular syphilide is the most resistant, and may require the intramuscular injection of a calomel suspension to hasten its clearance. Local mercurial treatment is at all times permissible, and the value of local mercurials and calomel fumigations is universally granted in certain otherwise intractable manifestations. Iritis responds readily and should be treated by mydriatics from the beginning to avoid iritic adhesions.

HEMIPLEGIA AND MONOPLEGIA: LESIONS OF PERIPHERAL NERVES.

Syphilis is the commonest cause of hemiplegia or monoplegia in the young. It is an endarteritic phenomenon and not a nervous one; it is a definite contraindication to salvarsan, but responds well to mercury, either by inunction or intramuscular injection. Recovery may be complete, but in the presence of thrombosis and retrograde infiltration and softening there may be some permanent nervous impairment. Arsenicals may be given with caution when convalescence is well established and the patient under the influence of mercury.

Lesions of the peripheral nerves are not uncommon in late syphilitics, and may occur comparatively early in the infection. Although at first aggravated by treatment, the response to medication is ultimately gratifying. In addition to specific treatment the usual resources of medical therapy are called for.

Surgical indications, apart from troublesome sequestra, are rarely met in syphilis.

It is well to remember that X rays are sometimes of singular service in dealing with stubborn tertiary or congenital lesions.

NEURO-RECURRENCES.

It has been estimated that over 30 per cent. of secondary syphilitics show pathological changes in their cerebro-spinal fluid; these changes occur early and are very resistive to treatment. This is at once a plea for early, vigorous, and persistent treatment, and a help to the understanding of a group of nervous phenomena which have come into prominence with the popularisation of the arsenical compounds. I refer to the neuro-recurrences. The lesions vary from cranial nerve paralyses to, in some cases, the alarming development of monoplegias or even spinal paraplegia. That these complications occur more frequently under arsenical medication is undoubted.

The fact that these lesions yield to active antisyphilitic treatment and that of an arsenical nature is sufficient to disprove the contention of their arsenical causation. They are now known to occur only in syphilitics who have been inadequately treated. They are evidences of specific meningo-vascular changes induced by spirochætes, "scotched, not killed," which linger in the inaccessible remotenesses of meningeal perivascular tissue, perineural lymphatics, and the bony foramina of the skull. For months their only evidences may be found in the behaviour of the cerebro-spinal fluid.

One may confidently assert that with an increased knowledge of the necessity for intensive treatment these cases will decrease and finally cease to be seen. This knowledge of their ætiology should be widespread, so that no practitioner should mistake the absence of skin and mucous membrane lesions and a negative Wassermann following a half-hearted course of arsenical compounds as justifying so bold an assumption as spirochætal extinction. This feeble therapy destroys the spirochæte in skin and mucous membrane lesions and in the blood stream, but by so doing destroys the possibility of the formation of immune bodies, leaving the unreached spirochæte free to act upon tissues practically protectionless.

The "chancre redux" is explicable upon a similar hypothesis of inadequate treatment.

Bearing all this in mind, it will, one hopes, become a more frequent custom to examine the spinal fluid in all late secondary cases and to be guided by one's findings in both treatment and prognosis.

SYPHILIS OF THE NERVOUS SYSTEM.

It has long been recognised that syphilitics are very prone in the later years of their infection to exhibit nervous and psychic phenomena of the most widely divergent characters. These nervous manifestations simulate all known nervous diseases, are sudden in onset, uncertain in their course, respond with varying degrees of success to antisyphilitic treatment, and occasionally recur. It was also gradually recognised that a history of long-past syphilis preceded the insidious onset and progressive march of the two most intractable diseases of the nervous system—locomotor ataxia and general paralysis.

It is now known that the spirochæte invades the central nervous system during the secondary stage in over 30 per cent. of cases. For many years the only evidence of this silent occupation can be found in the changes evidenced in the cerebro-spinal fluid. Normal cerebro-spinal fluid is a clear, colourless, limpid fluid, secreted by the cells of the choroid plexus, circulating in the subarachnoid space and irrigating the pericellular lymph spaces of the nervous parenchyma. On spinal puncture it issues steadily in quick drops. It has a specific gravity of from 1004 to 1008. It contains but a minute trace of globulin and albumose, some chlorides of sodium and potassium, a faint trace of glucose, and no appreciable cellular elements. Being poor in globulin it possesses but feebly the power to form antibodies, and it does not contain antibodies which may be present in the blood plasma. With rare exceptions it accepts no drug which may be brought it by the circulation. Antisyphilitic remedies do not reach it when given by ordinary means. It maintains an even and independent existence isolated from the possibility of influence by ordinary body processes. Any changes, therefore, found in so special and constant a fluid are the strongest possible evidences of change in its immediate environment—that is, the meninges or the nervous parenchyma.

Clinically, two types of syphilis of the nervous system are recognised—the parenchymatous and the meningo-vascular. With the exclusion of a positive Wassermann, there is at present obtainable with cerebro-spinal fluid no reaction pathognomonic either of parenchymatous or meningo-vascular syphilis. There is the strongest presumptive evidence, however, of certain findings being specific manifestations.

Changes in Cerebro-spinal Fluid.

The earliest change manifested in the spinal fluid is increased pressure, indicating the degree of irritation of the meninges. It is present in many other conditions, as fracture, cerebral tumour, meningitis, and in some toxic conditions—for instance, uræmia.

This increased pressure is followed by an increased globulin content, as revealed by a precipitate in presence of a saturated solution of ammonium sulphate. Although this globulin increase is present in meningo-vascular lesions, it is much more marked in parenchymous affections, and some observers state its frequency in paresis as 96 to 100 per cent. The reaction is also present in cord compression from any cause.

Normal cerebro-spinal fluid does not discolour a solution of colloidal gold. This reaction is occasionally seen in meningo-vascular involvement; but in most paretics, both adult and juvenile, discolouration will occur in from four to eight tubes of decreasing strengths. This test may thus differentiate true paresis from meningo-vascular lesions simulating it. The fact that the reaction is obtained in tuberculous meningitis and in disseminated sclerosis detracts somewhat from its value, apart from the presence of a positive Wassermann.

An increase in the lymphocyte count of cerebro-spinal fluid would appear to be constant in nervous syphilis. It may vary from 10 to 1200 cells per c.mm., and is to be regarded as an index of meningeal involvement. It is more prominent in direct proportion as meningo-vascular changes overshadow truly parenchymatous ones. Pleocytosis appears long before any nervous phenomena, and is one of the most significant changes. Granting this meningeal origin, it is easy to understand its occasional presence in small numbers in the fluid of confirmed alcoholics.

Should the spinal fluid give a positive Wassermann reaction this is conclusive, but pleocytosis, increased globulin content, and colloidal gold discolouration, and even clinical nervous manifestations, may long be present before the Wassermann reaction. It is claimed to be present in 100 per cent. of paretics, using 0 8 c.cm. of cerebro-spinal fluid. In tabes dorsalis it is less frequently obtained.

A certain number of meningo-vascular cases will react positively with small amounts of fluid, the percentage increasing markedly with increasing amounts of fluid used. Some observers claim that by using 2 c.cm. of fluid a positive reaction may be secured in all cases. This variation in result according to amounts of fluid used has been applied to differentiate between a parenchymatous and non-parenchymatous affection. A negative Wassermann by no means excludes cerebro-spinal syphilis.

Intravenous arsenical medication will abolish a positive reaction of the spinal fluid in meningo-vascular syphilis, but is without effect upon a parenchymatous reaction.

The Wassermann reaction of the spinal fluid—the last to come—is the last sign to disappear, and then only after greatly prolonged and intensive arsenical medication. In parenchymatous syphilis it is doubtful if it is ever abolished.

Cerebro-spinal Syphilis.

The manifestations of cerebro-spinal syphilis may vary from dull, persistent headache, vague neuritic and trophic signs to petit mal, epilepsy, or psychic disturbances; from basal meningitis to pseudo-tabes; from cranial nerve affections and choked disc to myelitis. Generally regarded, these lesions occur comparatively early, are rapid in onset, and wide in nervous manifestations; are accompanied by very marked changes in the spinal fluid; and respond well to judicious but energetic treatment. Often the lesions are so focalised as to justify the presumption of their being gummatous in origin; others suggest a more diffuse meningeal infiltration, as in pseudo-tabes; others, again, from paucity of spinal fluid cellular count are recognised as syphilitic endarteritis. These cases of non-parenchymatous nervous syphilis are very often accompanied by suggestive pupillary findings—varying from fixity, irregularity, and sluggishness to loss of the light reflex.

The phenomena of meningo-vascular syphilis are those of pressure or anæmia, never of destruction. The nerve and eye changes are never those of primary atrophy. The findings in the spinal fluid in these cases will depend upon the nature of the syphilitic change—whether a centrally-placed gumma, widespread meningeal involvement, or endarteritic in origin.

In a third of the cases the spinal fluid gives a positive Wassermann reaction—evidence of an active syphilitic process. It is usually accompanied by a high cell count—both of lymphocytes and leucocytes—in many cases as high as 1200 per c.mm. With this marked pleocytosis the normal reducing power of the spinal fluid disappears. In two-thirds of the cases the spinal fluid is negative to a Wassermann test. Pleocytosis will still be present, and there may still be loss of reducing power with Fehling's solution. This is an intermediary type. Both are evidence of extensive meningeal change.

A few cases show paucity of cell count, no modification of reducing power, and may or may not have a positive Wassermann reaction. With the support of clinical signs these findings justify the presumption of either a centrally placed gumma or an endarteritic process. In meningo-vascular syphilis the globulin content and the colloidal gold reaction are not markedly affected.

Parenchymatous Lesions.

The parenchymatous nerve changes are those of primary neurone irritation by spirochætal toxin and subsequent destruction of nerve cells. Nerve cells do not regenerate. The damage, although insidious in onset, is remittingly progressive. The spirochætes are actually in the nerve cells and have been repeatedly demonstrated. The damage is evidenced variously according to the seat of spirochætal activity. If in the frontal cortical cells, dementia paralytica; if in the cells controlling the posterior columns, tabes dorsalis; if in those responsible for the lateral column, paraplegia; if in the optic centres, primary optic atrophy.

In most cases of *tabes* the spinal fluid gives a negative Wassermann, the serum being more usually positive. There is no change in globulin content and but a moderate pleocytosis, averaging 50 cells per c.mm. The glucose content of the spinal fluid is not affected. These findings may be present for months before actual clinical evidence of the disease.

More active manifestations of the disease—usually meningeal in origin—may be heralded by a positive Wassermann reaction in the fluid, a more marked lymphocytosis ranging from 50 to 100 cells per c.mm., and a moderate increase in globulin. The glucose content is not changed.

In long-established tabes the Wassermann may disappear from both serum and spinal fluid, and the latter may show no appreciable changes. This evidences a purely degenerative stage of disease, is of poor prognostic value, and these cases will receive most benefit from re-educational methods in a suitable institution.

Cases of *paresis* usually show a positive Wassermann reaction in both blood serum and spinal fluid. The spinal fluid contains an excess of globulin and gives a typical colloidal gold discolouration curve. There is a moderate lymphocytosis of 20 to 30 cells per c.mm. There may be, in more acute cases, an added meningeal element, as evidenced by pleocytosis and loss of power of reduction of Fehling's solution. The findings in long-established cases with marked degenerative change may be almost universally negative.

There is in all parenchymatous nervous syphilis an accompanying *meningeal change*. It is because of this varying degree of meningeal involvement that the laboratory examinations of the spinal fluids of these cases present such apparently conflicting evidence. Although the examination of the spinal fluid will in some cases enable the clinician to forecast the probability of onset of tabes or paresis the diagnosis is, in the main, clinical and the cerebro-spinal fluid findings are confirmatory. The cerebro-spinal fluid is better regarded as an index to prognosis, for cases of parenchymatous nervous syphilis would appear to respond to treatment in direct proportion to their accompanying degree of meningeal implication, as evidenced in these cases by rapidity of onset, early and marked psychic disturbance, the high lympho- and leucocytosis in their spinal fluids, and the suppression of the glucose content. Cases of insidious onset and meagre spinal fluid findings are more purely parenchymatous in nature and are less suitable for and less responsive to treatment.

Treatment of Nervous Syphilis.

The best results in the treatment of nervous syphilis are yet to come. Laboratory methods have greatly enhanced our appreciation of the extent of the silent spirochætal advance upon the territory of the nervous system. We are gradually coming to classify these changes upon their serological evidence, as well as their clinical, and to look for better results in the prophylaxis of early medication rather than battle by persistent attack for dubious benefits when parenchymatous nervous syphilis is clinically established.

The treatment of *meningo-vascular syphilis* calls for caution, and the very real danger of a Jarisch-Herxheimer reaction should be remembered. Courses of the arsenicals given daily in small intravenous doses for a week and repeated every month should alternate with mercury and iodides. Such treatment should be preceded by intensive

mercurial injection or inunction, and where definite gummatous formation is suspected, by free administration of iodides. There will be few cases in which improvement will not soon be evidenced by clinical behaviour and pathological examination. In a favourable case pressure is reduced, pleocytosis disappears, the reducing power of the fluids returns, and a positive reaction in serum and, finally, in spinal fluid is eventually abolished.

Parenchymatous nervous syphilis responds to treatment according to degree of meningeal involvement, and the spinal fluid is both a guide to treatment and an index to prognosis. Tabetics are intolerant of mercury; careful supervision is required. Before considering intrathecal therapy the arsenical courses described above should be given. The Aachen method, as applied in tabes, has, in the opinion of many, much to commend it. It is with advantage given in conjunction with arsenical therapy.

It may be noted that in tabes an improvement in the spinal fluid, as evidenced by cellular decrease and disappearance of any globulin excess, is, if accompanied by a persistently positive Wassermann reaction in the blood serum, a herald of approaching paresis. These cases, the "Wassermann fast" cases, are disappointing in their ultimate course.

In favourable cases of tabes or paresis the spinal fluid will show reduction of cellular count, subsidence of globulin excess, and in some cases perhaps the disappearance of the Wassermann reaction from the serum. If, however, there is neither clinical improvement nor change in spinal fluid after four months' intensive treatment it is permissible to consider the desirability of *intrathecal medication* with salvarsanised serum. [A description of methods was here given.]

In many cases the amelioration of symptoms is so gratifying that the clinician is encouraged to widen the field of its applicability. In active tabes lightning pains are relieved, the crises are lessened in frequency, ataxia may be relieved, and sphincteric control returns. In paresis, apart from those cases showing active meningeal involvement, the results of treatment are poor, and intrathecal administration (salvarsan or mercury) of very dubious benefit.

THE PREGNANT SYPHILITIC.

In the female adequate pre-natal treatment, instituted even as late as the fourth month of pregnancy, can enable a syphilitic woman to give birth to a normal child, having in many cases a negative Wassermann. In those children, born with a positive Wassermann, it is possible, if pre-natal treatment has been carried out, to continue the treatment after birth and to secure a persistently negative reaction and freedom from clinical signs of disease.

In England alone there are about 27,000 deaths a year from pre-natal syphilis. The importance of this therapeutic possibility is evident and it is the strongest plea for the establishment of greatly increased facilities for pre-natal treatment and maternity centres.

Pregnant women tolerate well the arsenical compounds, and a small intravenous dose may be given weekly from diagnosis up to delivery. This with advantage is combined with a course of intramuscular injection of one of the insoluble mercurial creams unless there be a definite contra-indication, such as renal inadequacy or a history of eclampsia. If necessary, treatment may be continued in the infant from the first week of birth and injections given in the external jugular or the veins of the scalp at intervals of three weeks at the same time as mercury is given by inunctions or intramuscular injections of the soluble salts. It is well to give small doses and to bear in mind that intramuscular injection of arsenicals is not tolerated by children.

If congenital syphilis is to be successfully treated it must be treated early. The congenital syphilitic is infected in utero, and it is during gestation that the most active treatment should be given.

STANDARD OF CURE.

How shall we determine a standard of cure Older clinicians measured syphilis in periods of years. Are we by virtue of the recent additions to our therapeutic armamentarium entitled to think of this disease in terms of months? Are we as yet so cognisant of the life phases of *Treponema pallidum* that we can speak with certainty of its extinction? Has the spirochæte "resting stages"? Does it establish an arsenical tolerance? What determines a spirochætal advance? What is the real significance of the complement-deviation phenomenon? These questions are still unanswered. The prolonged latency of the disease, its protean manifestations, its silent, stealthy advance upon an unprotected nervous system, its inexplicable resistance in the later stage, should make us chary of too rash an optimism born of the brilliance of the immediate results of treatment on any individual presenting lesion. Rather than a standard of cure, let us think of a standard of treatment, and speak in terms of the remoteness of the treated infection. Fournier and Hutchinson required three years of constant treatment, and both were insistent upon the necessity of early and intensive medication. Dare we to-day ask for less?

If, after an intensive course of arsenical medication and the continuous exhibition of mercury for two years, a patient can show two years' freedom from physical signs of disease, has a persistently negative blood serum, a spinal fluid which shows no variation from normal in either pressure, globulin content, or cellular count, and which gives a negative Wassermann in amounts of 2 c cm.; and if after a period of freedom from treatment these conditions are still present and persist in spite of provocative treatment, it is, I think, justifiable, in our present state of knowledge, to presume this patient cured.

Finally, should this patient subsequently develop a fresh chancre, at a site differing from the first, this would be a re-infection, and would prove our contention. For syphilis does not confer immunity, and the real interpretation of all alleged immunity is that the so-called immune person is an active syphilitic.

INVALIDISM CAUSED BY P.U.O. AND TRENCH FEVER:

A REPORT FROM THE BOULOGNE BASE.

BY D. S. LEWIS, M.D.,
CAPTAIN, C.A.M.C.; NO. 3 CANADIAN GENERAL HOSPITAL;

J. H. THURSFIELD, M.D. OXON., F.R.C.P. LOND.,
MAJOR, R.A.M.C., (T.F.); OFFICER-IN-CHARGE, MEDICAL DIVISION, NO. 14 GENERAL HOSPITAL;

A. J. JEX-BLAKE, M.D. OXON., F.R.C.P. LOND.,
MAJOR, R.A.M.C. (T.F.); OFFICER-IN-CHARGE, MEDICAL DIVISION, NO. 54 GENERAL HOSPITAL;

AND

MICHAEL FOSTER, M.D. CANTAB., F.R.C.P. LOND.,
MAJOR, R.A.M.C. (T.F.); OFFICER-IN-CHARGE, MEDICAL DIVISION, NO. 55 GENERAL HOSPITAL.

Introductory Note by Colonel T. R. ELLIOTT, A.M.S., *Consulting Physician, Boulogne Base.*

"Trench fever, which is now widely spread among the troops in France, would seem from the point of view of wastage alone to merit every attention."

IN this sentence Hunt and McNee[1] emphasised at an early date in 1916 what the Medical Service in France soon appreciated in the statistics of sick wastage from divisions in the field. Their paper was the first to describe the prolonged chronic form which the malady was assuming, and the authors stated that "the average duration of the longer relapsing type of fever is not less than four to six weeks."

Wastage from trench fever continued to increase, and in 1917 a G.H.Q. Committee was appointed in France to inves igate the cause of the disease. The results of the experimental studies, which were made during 1917 and 1918 by British and American workers, settled the main ætiological question and showed how the spread of the contagion could be controlled. But despite this knowledge trench fever continued to spread among the British troops right up to the end of the war, owing to the great numbers of infected men and of infected lice which now formed a reservoir of the disease.

The Trench Fever Report of the American Red Cross Commission (1918) quotes on p. 2 a statement that in one British Army trench fever was responsible for about one-third of all the cases of sickness admitted to medical units. At the Boulogne Base, during the four weeks period of August, 1918, when influenza was not prevalent, there were 2311 cases of P.U.O. and trench fever admitted to hospitals, this

[1] Quarterly Journal of Medicine, July, 1916.

being 22 per cent. of the total sick admissions from the front. The figure is certainly too high for true trench fever, because the diagnosis of P.U.O. included other ailments, but it will serve to show that trench fever was responsible for something approaching one-fifth of our sick casualties. When this number was multiplied by the average time off duty for each case of trench fever, the aggregate wastage became relatively still more formidable.

The view that was at first prevalent in the Medical Service in France regarded trench fever as being a comparatively mild disease, and medical officers were in the habit of looking upon such cases as being capable of return to duty soon after the bout of fever. But in 1917 and 1918 this view was changing. The G.H.Q. Committee published a clinical report[2] on 170 cases that had been studied during the previous autumn in the special wards of No. 12 Stationary Hospital at St. Pol, in an army area. Only 70 of these cases were returned to duty, and 53 out of 170, or 31 per cent., were found to have developed severe tachycardia in the later course of the disease. The result of this experience was embodied in an official memorandum, dated May 25th, 1918, which was circulated throughout the service in France and stated in paragraph 4 that "trench fever frequently leads to a condition of tachycardia which disables a man for a long time from duty, but the liability to this is much diminished if the disease is treated carefully from the first with rest in bed."

Medical officers in consequence learned to look upon the disease with much greater apprehension of invalidism, and the feeling rapidly spread that sufferers from it needed prolonged hospital treatment, and therefore required evacuation to England. This feeling became so firmly established that in times of congestion at the base hospitals some divisional officers were in the habit of at once transferring most of their trench fever cases to England as soon as they reached the base, arguing that these casualties stood transport perfectly well, and that they would require longer hospital treatment than could be permitted in France. Returns from hospitals in the Boulogne Base showed that during the summer of 1918 as many as 30 per cent. of the trench fever and P.U.O. cases were being transferred to England. Officers serving in England reported, on the other hand, that most of these cases were of a trifling character and could be quickly discharged from the central hospitals to outlying medical units, from which they very slowly made their way back to duty in France.

The heavy demands on our armies in the fighting of 1918 made it imperatively necessary that every soldier who became a casualty should be returned to duty in the shortest possible time. Base hospitals in France were justified in retaining a man for two or even three weeks' treatment, if at the end of that time he could be transferred to a convalescent depôt with a fair certainty that a few weeks' hardening and physical drill would make him fully fit again for military duty. Such economy of man-power by reducing unnecessary invalidism of casualties became a chief aim of the administrative authorities of a base. In order to achieve it and check undue leakage to England from various hospitals, the D.D.M.S., Boulogne Base, employed returns showing week by week the percentage disposal of casualties in the chief groups, such as gas poisoning, trench fever, &c. These actual returns were compared with a standard of disposal that had already been proved to be sound and practicable, and hospitals that were shown by the general returns to be handling their cases in an uneconomical manner could then be restored to proper efficiency.

Such a standard of disposal did not exist for trench fever, and it was with the aim of ascertaining the average invalidism of this "P.U.O." group that the D.D.M.S., Boulogne, Colonel H. S. Thurston, C.B., sanctioned the arrangements necessary for collecting the statistics that are reviewed in this paper. The end of hostilities has taken away from these statistics their immediate practical value, and they are now recorded merely for their interest in the general clinical account of trench fever.

Five hospitals were selected, and in each a special ward was set aside for the personal study by the medical officer in divisional charge of the hospital of a total of 200 cases of "P.U.O. trench fever." All cases marked "P.U.O." or "trench fever" on the field medical card were admitted without selection as they arrived on convoy. Cases in which a definite cause of the fever could be recognised, such as bronchitis, &c., were then rejected after examination, and the true "P.U.O. trench fever" cases were detained for study. Permission was given, where desired, for the retention of any special case in the wards beyond the maximum time of retention then generally allowed for the base hospitals, whether that were 14 or 21 days, in order that the full history of these cases might be observed.

On discharge from hospital to convalescent depôt each case was provided with a special card indicating that he belonged to this group under investigation. The card was completed at the convalescent depôt by subsequent details of the history of the case, and on discharge of the patient to duty this card with its final statement was returned from the depôt to the original hospital. If the patient required readmission to a hospital from a depôt, he was sent back to the original hospital from which he had been first discharged, and so came once more under the care of the medical officer who had been responsible for the case. Thus this officer obtained a complete history of each case as it moved through medical units in France. All the convalescent depôts treating the cases lay within the Boulogne area. Cases with symptoms of "D.A.H." were sent for special examination to the Heart Centre at No. 1 Convalescent Depôt.

Various circumstances prevented one hospital from completing its returns. The figures analysed give, therefore, a total of only 822 cases from four hospitals. These patients were admitted to the base hospitals during the month of August and the first half of September, 1918, that is, during the interval when the summer epidemic of influenza had largely ended and before the winter epidemic began in November. The armistice of Nov. 11th altered all medical procedure at the base and at once reduced the need for efforts to return soldiers quickly as fit through convalescent depôts. But before that date practically all the cases dealt with in this report had been finished and their disposal determined. The main results can therefore be accepted as true for a time of active military operations. The after-histories of the men, on the other hand, after discharge to duty are no longer worth investigation. The main results are given in the subjoined tables of disposal:—

TABLE I.—*Total Disposals.*

Hospital.	Total cases.	To duty.	To medical board.	To U.K.
3rd Canadian General	218	180 (82·5%)	9 (4·2%)	29 (13·3%)
14th General...	195	159 (81·5%)	21 (10·8%)	15 (7·7%)
54th ,, ...	209	175 (84·0%)	7 (3·0%)	27 (13·0%)
55th ,, ...	200	170 (85·0%)	9 (4·5%)	21 (10·5%)
Totals	822	684 (83·2%)	46 (5·6%)	92 (11·2%)

TABLE II.—*Showing Cases which Required Evacuation to U.K.*

Hospital.	Total.	Heart or D.A.H.	Recurrent fever.	Debility.	Other causes unassociated with trench fever.
3rd Canadian General...	29	14	12	1	2
14th General	15	3	4	8	0
54th ,, ...	27	0	8	18	1
55th ,, ...	21	4	13	1	3
Totals	92	21	37	28	6

TABLE III.—*Showing Causes of Reference to Medical Board.*

3rd Canadian General...	9	1	0	5	3
14th General	21	0	0	13	8
54th ,, ...	7	0	0	3	4
55th ,, ...	9	4	1	0	4
Totals	46	5	1	21	19

Out of the total of 822 there were 138 cases who failed to reach within a reasonable time the category of duty to which they belonged before they fell sick with P.U.O. But 25 of these were invalided for other unassociated causes, so that nearly 85 per cent. recovered completely. The average time of invalidism for those who were returned to duty in

[2] Brit. Med. Jour., Jan. 19th, 1918.

France was about 60 days, which was roughly divided as follows: two weeks in Army medical units; three weeks in base hospitals; four weeks in convalescent depôts.

The results of the time of invalidism agreed closely with the estimate already quoted from the paper by Hunt and McNee, and the proportion of more serious cases of chronic invalidism is very similar to that given by Major W. Byam,[3] as derived from the general impressions of other observers in France.

The first point that seizes attention on comparing the reports at the four separate hospitals is the extraordinary closeness of the numerical results given not only for the final estimate of fitness, but also for the time consumed in invalidism. This was a clinical estimate made by experienced physicians who were dealing with their material, each in almost complete independence of the others, and without knowledge of the results that were being established by their colleagues. The material studied in the three British hospitals was probably identical, for each of these three rejected from 20 up to 50 per cent. of the P.U.O. cases admitted from the front because they did not appear to belong to the P.U.O. group. No. 3 Canadian General Hospital, on the other hand, rejected very few, but included in a separate P.U.O. group of mild character about 25 per cent. of its cases, which possibly might have been rejected at the other hospitals.

The next point is the disparity of opinion as to the name that should be given to the state of feebleness which trench fever produced in a small proportion of the patients when there was no evidence of recurrent pyrexia. "Debility" was used for this condition by three of the physicians, whereas the fourth insisted on the predominance of the features of D.A.H., and strengthened his opinion by the view of the specialist officer at the heart-training centre. Even at this fourth hospital, however, tachycardia, apart from subjective symptoms, was not found to be a feature of serious prognosis; for though it was observed in at least 30 per cent. of the trench fever group during early convalescence, it disappeared in two-thirds of these cases under the training of convalescent depôt life.

D.A.H., or heart weakness, was recorded as a cause of prolonged invalidism in 2 per cent. of the 600 cases dealt with at the British hospitals, and in 7 per cent. of the 218 at No. 3 Canadian General Hospital. When the fatiguing influence of long campaigning upon these soldiers previous to their trench fever is discarded, it becomes evident that D.A.H. is rarely a direct result of trench fever in itself. In this reference may be quoted the observations of the Trench Fever Report of the American Red Cross Commission (p. 310), who reported that in none of their 62 experimentally infected patients were there any symptoms of D.A.H. or of the "effort syndrome" when once the active infection had been overcome.

Anæmia has been supposed to be a definite result of trench fever because the patients sometimes show a washed-out appearance when a bout of fever recurs later.[4] Of this no definite evidence was obtained, but the question will be discussed in the detailed clinical papers which medical officers who were in charge of these cases intend to publish in sequence of this statistical summary. The after-history of all the 92 patients evacuated to U.K. will also be investigated and described.

The general results of the Boulogne observations agree with the views held earlier in the war—namely, that cases of trench fever recover quickly and without any permanent ill-effect as soon as the infection, whether long- or short-lived, dies down. No specific treatment has yet been discovered which will kill off the infection. The best general means are probably much the same as those which were used with such admirable results in France last summer for the treatment of relapsing malaria cases from the Mediterranean—namely, to take the patient away from hospital environment and slowly to restore his general resistance by food, fresh air, and light exercise until the infection is overcome. Few cases required prolonged rest in hospital, and the majority can be returned soon and successfully to full duty. Such a view of their normal disposal is obviously governed only by a consideration of the invalidism of the casualties who have already gone sick. It is not concerned with the other aspect of the question, as to whether an early return of such casualties to the lice-infested areas at the front may not be a disadvantage because it may reintroduce possible sources of infection to other healthy troops.

[3] Transactions of the Society of Tropical Medicine and Hygiene, vol. xi., p. 269, June, 1918.

[4] Grieveson: THE LANCET, 1917, ii., 84.

No. 3 Canadian General Hospital, Captain D. S. LEWIS.

A special ward of 92 beds was set aside for the observation of cases sent down from the field ambulances and casualty clearing stations diagnosed P.U.O. or trench fever. A total of 230 cases was received. Of these, 12 were rejected because of inaccuracies in the diagnosis—cases of bronchitis, 3; malaria, 2; gastritis, pleurisy, of each 1. The remaining 218 form the basis of the following report.

Diagnosis.—It is doubtful if at any set time in its course trench fever can be said to present a sharply-cut clinical picture. The great variation in the length of illness before admission to our hospital made it almost impossible to diagnose the cases according to any definite set of physical signs, and the following arbitrary method of differentiation was adopted to ensure a certain degree of uniformity in the diagnoses:—

1. Those cases showing a short bout of fever with general malaise, &c., which rapidly improved and showed no tendency to relapse were regarded as simple P.U.O.

2. Those showing a definite relapsing course, with a return of the initial symptoms in whole or in part, were diagnosed "trench fever." A certain number of cases showed a sharp initial pyrexia, which later settled to a long-continued low grade of fever (99°–101° F.) accompanied by a persistence of symptoms. These were also classed as "trench fever."

Where a case originally placed in the first group relapsed at a convalescent depôt, the diagnosis was revised and the case classed as "trench fever." The distribution of the cases between the two groups was as follows: P.U.O., 59 cases, 27·1 per cent.; trench fever, 159, 72·9 per cent.

The cases of P.U.O. were of a very mild character. They had been ill relatively few days before admission to hospital, and 93·2 per cent. were discharged within 20 days of their arrival. Only one patient was sent to England. He had a persistent tachycardia and was evacuated after 52 days at No. 1 Convalescent Depôt. His history suggested that the D.A.H. had been of long standing.

The trench fever cases, on the other hand, showed a higher percentage of the more acutely ill. Two-thirds of these patients had been ill for less than 15 days before admission to the base, and it was possible to discharge only 108 of the 159 (67·8 per cent.) to convalescent depôt before the 20-day limit. Seven of these were subsequently returned to hospital for evacuation to England. Seven other cases were sent from the convalescent depôt to Medical Board, 4 on account of debility, 1 on account of D.A.H., and the remaining 2 for disabilities other than the sequelæ of trench fever.

The duration of stay at No. 7 Convalescent Depôt did not give accurate information as to the minimal time required by these patients for convalescence, because a considerable proportion of the men were retained for some time on staff employments. This longer period of observation at the depôt has, however, been valuable because it has impressed upon us the fact that the number of serious relapses after transference from this general hospital has been surprisingly low in uncomplicated cases. Ten out of a total of 187 cases were recorded at No. 7 Convalescent Depôt, of which only 4 required readmission to hospital.

Disposal of cases.—The final disposal of all cases was as follows: To U.K., 29, or 13·3 per cent.; to Medical Board, 9, or 4·2 per cent.; to Duty "A," 180, or 82·5 per cent. Total cases, 218.

The distribution of these cases among the three clinical groups of fever was the following:—P.U.O., 59 cases: to U.K., 1 (D.A.H.); to Medical Board, 2 (both debility); to Duty "A" 56. Trench fever, 137 cases: to U.K., 28; to Medical Board, 7; to Duty "A," 124.

The causes of unfitness in the 38 patients who failed to reach classification "A" were:—(1) 9 cases to Medical Board: D.A.H., 1 case; debility, 5 cases; other unassociated causes, 3 cases. (2) 29 cases to U.K.; D.A.H., 14 cases; recurrent fever, 12; debility, 1; other unassociated causes, 2 (impetigo and a previous albuminuria).

TABLE IV.—*Showing in Successive Periods of Five Days the Time Spent in Each Type of Medical Unit.*

Group.	No. of days.	Front line medical unit.	In base hospital.	In No. 7 Convalescent Depôt.
		Total number of cases for each period.		
P.U.O., 59 cases.	1- 5	19	20	3
	6-10	29	24	6
	11-15	4	7	5
	16-20	3	4	5
	21-25	2	2	9
	26+	2	2	30
Trench fever, 159 cases.	1- 5	18	5	3
	6-10	41	48	7
	11-15	41	31	9
	16-20	15	27	32
	21-25	17	27	23
	26+	27	21	55

General Review of the Cases.

D.A.H.—A total of 14 cases were sent to U.K. for this condition. One was sent direct from hospital on account of persistent tachycardia (115–125). The remainder were first passed through the Heart Training Centre at No. 1 Convalescent Depôt.

Originally 15 patients were transferred from hospital to this depôt on account of precordial pain, giddiness, and tachycardia. They did not improve with treatment there, and ultimately 13 went to England with the cardinal symptoms of the "effort syndrome," associated with an occasional slight rise in temperature. These patients rarely complained of much pain in the legs or of general malaise. Of the remaining 2, 1 was marked B ii. by the Medical Board after 57 days in the depôt, and 1 was discharged to duty, but with a still persistent tachycardia.

Captain J. A. Venning, R.A.M.C., the officer in charge of the heart section, states that the results of treatment were very unsatisfactory in the whole of this series. In his opinion the condition is not a true D.A.H. He suggests that it is more closely allied with a true myocardial change caused by smouldering chronic infection, and that this accounts for the persistence of the tachycardia. This may be the explanation of some cases, but it does not account for the tachycardia in a considerable proportion where the temperature remained below 99·5° for long periods at the convalescent depôt without any corresponding decrease in the pulse-rate.

The average time of treatment for the 14 cases of D.A.H. sent to England was: in base hospital, 21·8 days; in No. 1 Convale-cent Depôt, 32·5 days; total illness, 68 days.

Simple tachycardia.—Among the *P.U.O.*'s 8, or 13·8 per cent., showed at the time of discharge from hospital a pulse-rate above 100 after standing up for two minutes. One of them in addition had the other cardinal symptoms of D.A.H., and he was ultimately sent through No. 1 Convalescent Depôt to England with that condition. The others improved at No. 7 Convalescent Depôt and were discharged fit.

In the *trench fever* group, 47 cases, or 29·5 per cent., had a similar increase in pulse-rate. Twelve of these had ultimately to be evacuated to U.K.

Tachycardia was therefore much more common in the cases of trench fever than in the simple P.U.O.'s. No definite relation could be made out between the time of getting the patient out of bed and the occurrence of the condition. The first half of the series were kept in bed 4–5 days after their temperature became normal, and were put to bed again if their afternoon temperature rose above 99°. The later admissions were allowed out of bed within three days of their having a normal temperature, and they were not made bed patients again unless their temperature subsequently rose above 100°. There did not seem to be any increased incidence of tachycardia amongst these latter cases.

Persistent fever.—Twelve cases of trench fever were evacuated to U.K. because of the relapsing type of the disease. There were a few instances of the low-grade smouldering variety with a temperature rarely above 100 5°, but the majority showed either an undulating type of fever or relapses of the "spike" variety. One case had been in another hospital in 1917 for 28 days with trench fever followed by a series of relapses. This necessitated his transfer to England, where he remained a further six months in hospital. He had been returned to France just three weeks before his admission to us, and probably had never been in fit condition for foreign service. While in hospital he had no fever, but constantly complained of pain in the legs and weakness. After 11 days in the ward he was evacuated to U.K. as unfitted by debility.

The average stay in base hospital for the 12 cases of persistent fever was 25·5 days, and the average total length of illness before evacuation to U.K. was 44·8 days.

An inquiry was made in the whole series of 218 cases into the history of previous fevers. In view of the epidemic of influenza during the early summer it was not surprising that 19·7 per cent. of the total cases gave a history of an attack of what appeared to have been influenza within six months. The average incidence of this latter infection throughout the B.E.F. during the summer was 11 or 12 per cent.

There was a history of P.U.O. or of trench fever in a low percentage of cases, varying from 4·5 to 9 5 per cent. in the three groups. Malaria and other fevers were represented in even smaller numbers.

Prognosis.—An attempt was made to identify any particular kind of case which proved particularly resistant to treatment, and to see if these cases could be recognised in the early part of their stay in hospital. Apart from those showing a persistent tachycardia, no definite clinical group of cases could be made out.

There did not seem to be any relation between the type of temperature curve and the necessary length of hospital stay, except that patients showing "spikes" of fever in which the maximum rise of temperature fell steadily with the progress of the disease, seemed to clear up more rapidly than did those having an undulating or a low-grade continuous type of fever. It was also a simple matter to decide upon the disposal of those who had been sick for a long time before admission, as opposed to those whose illness had been of comparatively short duration.

In the final analysis it was found that the prognosis rested more upon personal experience of the disease than upon any clear-cut grouping of the cases. The accuracy of an attempted prognosis was tested in the following way. On the fourteenth day after admission to our hospital estimates were made for each of the patients still remaining in the wards of the probable period of invalidism in hospital or of the need for evacuation to England, and this estimate was entered on the index card. On successive weeks the estimate was reviewed in comparison with the actual progress of the case. It was found that the prognosis could be given on the fourteenth day with considerable accuracy for those cases which presented the symptoms as well as the signs of D.A.H. With the group of persistent or relapsing pyrexia, on the other hand, there was greater difficulty, and it was ultimately found that 25 per cent. of those which on the twenty-first day were regarded as likely to recover and be fit for duty in France, did not convalesce as had been hoped and they were consequently sent to England.

No. 14 General Hospital, Major J. H. THURSFIELD.

For the investigation of the real character and prognosis of patients admitted to the base hospitals with the diagnosis of P.U.O. I was directed to keep records of 200 cases of P.U.O. and trench fever, rejecting those in which another diagnosis could be made.

During August and September, 1918, 319 cases were so admitted to this hospital, of which 213 were finally diagnosed P.U.O., or trench fever, or febrile myalgia.

Of the 106 rejected from the series the majority were influenza, bronchitis, or tonsillitis, but there were also two who were sent on to No. 14 Stationary Hospital as enteric, several of rheumatic fever, acute or subacute, and several of pleurisy or broncho-pneumonia.

Of the 213 cases remaining, 148 were ultimately discharged fit "A," 15 fit "B," 17 to medical board, 15 were evacuated to U.K., and 18 were not traced. Leaving these last out of account I had to deal with 195 patients, of whom 148 (75·8 per cent.) were ultimately classified fit "A." Of these men the average age was 25½ years, the extremes being 18 and 42.

The average stay in hospital reckoned from the day they entered the field ambulance to the day they went out to convalescent depôt was 36 days; the average stay in convalescent depôt was 26 days; the average time off duty therefore was 62 days. The majority of the patients (61 per cent.) were discharged to full duty between the seventh and thirteenth weeks after onset of illness. Only 10 per cent. required a longer period than 13 weeks off duty, while 29 per cent. had a stay of less than seven weeks.

In parentheses it should be noted that both in hospital and in convalescent depôts there are circumstances entirely unconnected with their P.U.O. or trench fever which tend to prolong the stay. For example, some of these men contracted influenza while it was epidemic; others were detained for dental treatment longer than they would otherwise have been kept; and others still for minor surgical ailments such as boils or other slight suppurations. It is probable, therefore, that this time is somewhat longer than it would be for a series of uncomplicated cases.

Of the 15 men marked Fit "B" 11 were originally category B men; the other 4 were graded B at convalescent depôt, not being able to stand the full physical training.

Of the 17 men sent to medical board 9 were marked "Debility," which means that after a prolonged stay in hospital and convalescent depôt they were still unable to be given full training and were sent on to be reduced in category. Three were sent for prolonged dental treatment, 1 for deafness, 2 for deformities of the feet, 1 for defective vision, 1 for reasons not stated.

[Of the 15 men sent to England 3 had marked dilatation of the heart, 4 had five or more relapses of fever and pains and could not be expected to recover without very prolonged convalescence, 5 were so prostrated by their illness that a similar prognosis was obvious—they could hardly stand, even weeks after the cessation of all fever. The remaining three cases were evacuated for anæmia and general ill-health.

No. 54 General Hospital, Major A. J. JEX-BLAKE.

1. *Early diagnosis.*—The early diagnosis of trench fever from other acute febrile conditions, such as influenza, bronchitis, &c., is hardly possible in field ambulances or casualty clearing stations, and such cases as they pass through are often labelled "P.U.O." or "N.Y.D. pyrexia."

The following table shows the final base hospital diagnosis in 448 cases admitted during August and September, 1918, to No. 54 General Hospital with the F.A. or C.C.S. diagnosis "P.U.O.," "N.Y.D. pyrexia," "Trench fever," or "Myalgia."

TABLE V.

Trench fever ...	215	Malaria	6	Synovitis	1
Influenza	60	Pleurisy	5	Dysentery	1
Bronchitis	57	Tonsillitis	4	Jaundice	1
Debility	32	Rheumatism ...	3	Lumbago	1
Gastritis	22	Conjunctivitis ...	2	Otitis	1
Diarrhœa	14	Contusions	2	Oxaluria	1
D.A.H.	9	Enteric fever ...	2		
Laryngitis	7	V.D.H.	2		

2. *Disposal.*—The complete disposal of 209 consecutive cases of trench fever is shown in the left-hand part of the following table. This has been drawn up in such a way as to illustrate the influence of age upon the course and severity of the disease.

TABLE VI.—*Showing Duration and Disposal of 209 Cases of Trench Fever.*

Ages.	No. of cases.	Final disposal.				Additional U.K. cases if disposal on—	
		Convalescent depôt.	Medical board.	U.K.	Per cent. to U.K.	14th day.	21st day.
18–19 ...	51	46	1	4	8	16	6
20–34 ...	120	104	3	13	11	23	6
35–42 ...	38	25	3	10	26	8	3
Totals...	209	175	7	27	—	47	15
Per cent.		84	3	13	—	—	—

The right-hand part of the table shows the importance of prolonging the stay in base hospital permitted to these patients Had evacuation to U.K. on the fourteenth day been insisted upon, 74 patients would have been sent to England instead of 27, or 35½ per cent. instead of 13 per cent.

Fourteen patients were kept in base hospital for periods of from 5 to 10 weeks, all subsequently going to convalescent depôt and being returned fit for duty.

Influence of age on the disposal.—It would appear that in patients returning fit to duty the disability produced by an attack of trench fever is likely to last, on the average, for about 9 weeks at any age between 18 and 42. But the percentage of patients so severely affected as to require evacuation to the U.K. is only 8 among the younger patients, rising to 26 among the older.

The 7 cases sent up for Medical Board.—These patients were boarded for the following affections: debility, 2; senile debility, 1; dental trouble, 2; myalgia, 1; otosclerosis, 1.

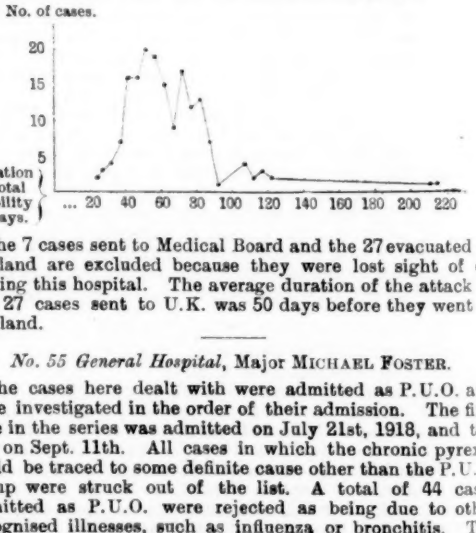
The 27 cases evacuated to U.K.—These patients were evacuated for the following affections: continued fever and debility, 8; debility and myalgia, 8; debility, 8; debility and loss of weight, 2; tenosynovitis of wrist, 1.

3. *Duration.*—Table VII. shows the average duration of the attack or successive attacks in the 175 cases that returned to duty. As is shown in the table, age has little or no bearing on the probable duration of an attack of trench fever, though it may prolong the subsequent convalescence of the case.

TABLE VII.—*Average Duration of Disability in Days in the 175 Cases Leaving Convalescent Depôt Fit for Duty.*

Ages.	No. of cases to convalescent depôt.	Average days.			Average total days.
		Before admission to base hospital.	In base hospital.	In convalescent depôt.	
18–19	46	18	22	28	68
20–34	104	18	21	25	64
35–42	25	14	19	27	60
Total.	175	—	—	—	—

No case was off duty for less than 20 days. Eleven cases were off duty for from 105 to 126 days. One case was off duty continuously for 211 days, 190 of which were spent in hospitals (five) or convalescent depôts (four). The details for 175 "A" cases are shown in the following graph.



The 7 cases sent to Medical Board and the 27 evacuated to England are excluded because they were lost sight of on leaving this hospital. The average duration of the attack in the 27 cases sent to U.K. was 50 days before they went to England.

No. 55 General Hospital, Major MICHAEL FOSTER.

The cases here dealt with were admitted as P.U.O. and were investigated in the order of their admission. The first case in the series was admitted on July 21st, 1918, and the last on Sept. 11th. All cases in which the chronic pyrexia could be traced to some definite cause other than the P.U.O. group were struck out of the list. A total of 44 cases admitted as P.U.O. were rejected as being due to other recognised illnesses, such as influenza or bronchitis. The remaining 200 cases presented for the most part definite symptoms of trench fever, a few with indefinite pains and irregular pyrexia were classed under the heading of febrile myalgia.

As a whole, the investigation may be regarded as an attempt to define the duration of hospital and convalescent treatment necessary to render a man suffering from trench fever fit again for the line. Turning to the immediate figures the result of the inquiry is shown in the following particulars.

Total cases, 200. Disposal: to U.K., 21, or 10·5 per cent.; to Medical Board, base details, 9, or 4·5 per cent.; to Duty "A," 170, or 85 per cent.

The 9 cases discharged to Medical Board were sent for the following reasons: heart or D.A.H., 4 cases; recurrent fever, 1 case; chronic myalgia, 1; dizziness, 1; injured knee and hammer-toe, 2.

The 21 cases transferred to U.K. were: heart or D.A.H., 4 cases; recurrent fever, 13; debility, 1 case; otorrhœa, 1; pleural effusion, 1; influenzal pneumonia, 1.

A total of 170 cases, or 85 per cent., was ultimately marked up for Duty "A" after treatment at convalescent depôts. The question then arises, from an administrative point of view, as to what was the time of hospital treatment needed to enable these patients to pass on through convalescent depôt to the full grade of military fitness. In consequence the following table has been drawn up showing the time spent in front line medical units, the time spent in base hospital and in convalescent depôt, and, finally, the total time off duty.

TABLE VIII.—*170 Patients Ultimately Discharged Fit "A," showing the Number of Cases Evacuated from Each Type of Medical Unit in Successive Periods of Five Days.*

(A) Front-line medical unit. (B) Base hospital. (C) Front and base hospital combined. (D) Convalescent Depôt. (E) Total time off duty.

Time spent in each med. unit.	(A)	(B)	(C)	(D)	(E)	Time spent in each med. unit.	(A)	(B)	(C)	(D)	(E)
1-5 days.	52	19	2	16	—	66-70 days.	—	—	—	—	12
6-10 ,,	57					71-75 ,,	—	—	2	—	15
11-15 ,,	13	45	11	17	2	76-80 ,,	—	—	—	—	4
16-20 ,,	12	44	28	35	—	81-85 ,,	—	—	—	—	6
21-25 ,,	9	25	36	19	3	86-90 ,,	—	—	—	—	2
26-30 ,,	3	12	24	19	10	91-95 ,,	—	—	—	—	4
31-35 ,,	3	8	21	23	15	96-100 ,,	—	—	—	—	3
36-40 ,,	1	8	10	18	15	101-105 ,,	—	—	—	—	—
41-45 ,,	—	3	19	9	14	106-110 ,,	—	—	—	—	1
46-50 ,,	1	5	4	6	12	111-115 ,,	—	—	—	—	3
51-55 ,,	1	1	5	5	16						
56-60 ,,	—	—	5	3	20	Total ...	170	170	170	170	170
61-65 ,,	—	—	3	—	13						

The average time per man spent in base hospital of all the 200 cases was 21·1 days. The average time per man of those who were returned to Duty "A" was 20 days. A study of the above table will show that 63·7 per cent. of cases subsequently becoming fit for Duty "A" were discharged to convalescent depôt in 20 days or less of base hospital treatment, while 78·5 per cent. of such cases were discharged in 25 days or under. These figures, however, need correction with reference to the time spent by a case in front-line medical units, which may vary within wide limits, and this variation exerts a definite influence on the expectation of the probable length of stay in a base hospital.

The average length of stay in front-line units was 10·4 days, and 85·8 per cent. of all cases had been evacuated within 15 days.

Column C in Table VIII. gives an average length of stay for each patient in front medical units and base hospital combined as 30·4 days. From these figures it will be seen that whereas from the base hospital alone 78·5 per cent. were discharged to convalescent depôt in 25 days or under, when the combined stay in front-line units and base hospital is taken a percentage of 77·9 was not reached until the thirty-sixth or fortieth day. This result works out in approximate conformity with the average length of stay in front-line units, which is 10·4 days. On the supposition that cases of trench fever were received at the onset, the expectation of a stay in hospital of a case would be increased from 10 to 14 days.

Turning to Column D for the last phase of a patient's treatment, his stay in convalescent depôt, it is seen that this may vary within considerable limits. Of the 170 "A" cases the average stay in convalescent depôts was 28·5 days.

Finally, the average total time off duty for the 170 cases who returned to Duty "A" was 56·9 days: front-line units, 10·4 days; base hospital, 20 days; convalescent depôt, 26·5 days.

AN ANALYSIS OF SYMPTOMS IN CEREBRO-SPINAL FEVER:

BASED ON ONE HUNDRED CASES OF EPIDEMIC MENINGITIS CHIEFLY DUE TO THE MENINGOCOCCUS.*

BY THE LATE A. H. CARTER, M.D., F.R.C.P.LOND.,
LIEUTENANT-COLONEL, R.A.M.C.(T.); FORMERLY PROFESSOR OF MEDICINE AT THE UNIVERSITY OF BIRMINGHAM;
AND
Q.M.-SERGEANT J. T. BOYES, R.A.M.C. (T.)

THIS record is compiled from notes made by the late Lieutenant-Colonel A. H. Carter, and entrusted by his widow to Dr. A. G. Gibson for publication. It deals with 100 cases admitted to the Lucknow Isolation Hospital, Tidworth, as cerebro-spinal fever, from March 13th, 1916, to March 30th, 1917. All the cases came from camps or stations in the Salisbury area of the Southern Command. Four of them were considered either on bacteriological or clinical grounds to be due to causes other than the meningococcus.

Age.—The average age of the British who recovered was $20\frac{6}{12}$ years, of those who died $23\frac{7}{12}$ years; that of the colonials was $23\frac{5}{12}$ years and $24\frac{8}{12}$ years respectively. The total number of the British was 39; 26 recovered, 13 died. Of the 61 Overseas troops (57 Australians, 3 New Zealanders, 1 Canadian) 34 recovered and 27 died.

The places of origin are as follows:—

Fargo Camp, 22 cases (9 r., 13 d.); Chiseldon, 17 cases (13 r., 4 d.); Lark Hill, 15 cases (11 r., 4 d.); Perham Down, 11 cases (6 r., 5 d.); Bulford, 13 cases (7 r., 6 d.); Rolleston, 6 cases (5 r., 1 d.); Tidworth, 5 cases (4 r., 1 d.); Park House, 4 cases (2 r., 2 d.); Sling, 3 cases (2 r., 1 d.); Windmill Hill, 2 cases (2 d.); Sutton Veny, 1 case (1 r.); Upavon, 1 case (1 d.).

Fargo Camp contributed the greatest number (22), of whom more than half died. There are indications in a sequence of cases that some particularly virulent infection was present in one or more camps, and probably the Fargo cases, with their high death-rate, are attributable to this cause. The same remark applies to Bulford, with 6 deaths out of the 13 cases.

Seasonal and Meteorological Conditions.

The period dealt with covers just over a year, and the monthly incidence of the disease and death-rate, with the weather conditions prevailing at the time, were charted. The barometrical pressure, rainfall, amount of sunshine, temperature, and prevailing wind were collated from the records of the Meteorological Society. All the observations were taken at the No. 5 Station, Wilton House, which includes the Salisbury area. I am indebted to the Radcliffe Observer, Dr. A. Rambaut, for putting the figures in his observatory at my disposal and for much help and advice.

The case incidence was as follows:—

1916: March, 3 cases (3 r.); April, 4 cases (4 r.); May, 3 cases (2 r., 1 d.); June, 4 cases (3 r., 1 d.); July, 15 cases, (10 r., 5 d.); August, 6 cases (3 r., 3 d.); September, 3 cases (1 r., 2 d.); October, 9 cases (4 r., 5 d.); November, 6 cases (3 r., 3 d.); December, 10 cases (6 r., 4 d.). 1917: January, 17 cases (8 r., 9 d.); February, 16 cases (10 r., 6d.); March, 4 cases (3 r., 1 d.).

The heaviest case incidence was in January, 1917, the next two being January, 1917, and December, 1916. This accords with previous experience. There was an unusually large number of cases in July, 1916, with a heavy death-rate, and there do not appear to be any predisposing or favourable weather conditions. A comparison of the meteorological conditions and case and death percentages rather indicates that the disease occurs independently of weather conditions. The temperature and rainfall varied with the seasons, and a few cases occurred in every month, though the colder months, when men most crowd together and omit proper ventilation, had the largest percentage of cases. The July weather was, on the whole, cool and dull for the time of year, the sunshine being below the average, the rainfall moderate, and the barometrical pressure varying between 29·8 and 30·2.

It may be noted here that in July and also in December and January there were cases in rapid succession—i.e., only a day or two intervening between the admission of a case and the arrival of the next. The information available does not enable me to trace these cases to any carrier or source of infection, but the facts suggest one or more carriers of a particularly virulent strain.

History of Onset.

The information respecting the prodromal period is very varied. In some cases nothing is known and the onset is simply described as "sudden." In one of these cases the patient was apparently quite well overnight, and feeling fit in the morning went on duty as usual, being found a little later quite unconscious. In another case the patient was taken ill with vomiting and loss of consciousness while at a kinema show. The history of the early stages so far as it has been possible to ascertain same is now given:

Ill with "influenza," 7 cases; period 1 to 15 days; 3 r., 4 d. "Ill" and deaf, 1 case; period 4 days; r. A "cold," 4 cases; period 7 to 42 days, av. about 14 days; 2 r., 2 d. Sore throat, headache, feverish, 3 cases; period 1 to 7 days; 2 r., 1 d. (One of these was a c.-s.f. contact. Symptoms existed a week. Throat swab negative day preceding admission.) Headache, and pains in back and limbs, 22 cases; period 6 hours to 10 days, av. 1 to 2 days; 13 r., 9 d. Headache and shivering, 7 cases; period 1 to 14 days, av. 1 to 2 days; 4 r., 3 d. Headache and vomiting, 26 cases; period 4 hours to 42 days, av. 1 to 2 days; 17 r., 9 d. "Ill" with malaise, 9 cases; period 2 to 56 days, av. 2 days; 7 r., 2 d. Became suddenly unconscious or semiconscious, 7 cases; 4 r., 3 d. No history except sudden "illness," 3 cases; period 4 hours to 1 day; 2 r., 1 d. No history at all, 8 cases; 2 r., 6 d. Pneumonia, 1 case; period 2 days; r. Previous attack c.-s.f., 1 case; r. (c.-s.f. 12 months earlier—recovery, then nervous breakdown, neuritis, never really well, headache, vomiting, fever 3 days before admission.) ? Sequela of acute attack of gonorrhœa, 1 case; period 5 days; r.

Symptoms and Complications.

The principal symptoms and complications with the relative frequency with which they occurred are shown below. These are taken from the time of admission and are irrespective of those classified in the paragraph dealing with onset.

—	C	R	D	—	C	R	D	—	C	R	D
Arthritis ...	1	1	—	Nasal catarrh	5	3	2	Pupils—			
Babinski's sign	4	3	1	Otorrhœa (old)	2	1	1	Dilated, sluggish	12	9	3
Cough	19	13	6	Opisthotonos..	4	3	1	Contracted...	1	1	—
Conjunctivæ suffused ...	6	5	1	Orchitis† ...	3	2	1	Rashes—			
Conjunctivitis	3	3	—	Paresis—				Bryt hemato... ...	7	4	3
Convulsive movements...	3	—	3	Diplopia ...	4	2	2	Hæmorrhagic ...	28	15	13
Cheyne-Stokes respiration ...	3	—	3	Dysphagia...	3	—	3	Herpetic ...	17	12	5
Cystitis	2	1	1	Facial	4	3	1	Urticarial ...	6	5	1
Deafness... ...	9	6	3	Incontinence‡... ...	19	4	15	Reflexes—			
Epistaxis ...	1	1	—	Paraplegia...	2	1	1	Exaggerated	7	6	1
Fainting attacks	1	1	—	Paralysis—				Sluggish ...	10	7	3
Headache ...	78	49	29	R. arm ...	1	1	—	Sore throat ...	6	4	2
Head retraction	26	17	9	L. arm and leg	1	—	1	Stiff neck ...	67	40	27
Hiccough ...	3	—	3	Strabismus	5	3	2	Synovitis ...	8	6	2
Hydrocephalus*	2	—	2	Speech affected ...	2	2	—	Semiconscious and violent...	8	2	6
Kernig's sign	78	47	31	Panophthalmitis	2	1	1	Tache cerebrale	13	10	3
				Pains§	51	28	23	Vomiting ...	67	44	23
				Photophobia...	4	3	1				

C = cases. R = recovered. D = died. * Ascertained (P.M.)
† In one case the orchitis preceded the c.-s.f.
‡ Urine and fæces. § In back, neck, and limbs.

The most widely prevalent symptom was *headache*, varying from a mild frontal headache to most violent pain, causing the patient to scream and constantly complain of it.

The next in order was *vomiting*, which was a positive symptom in 67 of the cases; a large number of such cases recovered. It was entirely absent in 29 cases, of which 12 recovered and 17 died. It varied considerably in character and violence. Sometimes it formed one of the initial or early features, and, again, in other instances it did not appear until the middle or towards the end of the disease. In two at least of the cases that recovered the vomiting was incessant and intractable; in others, the patient only vomited once or twice. Marked cerebral symptoms did not necessarily coincide with vomiting. In some of the worst fulminating cases it was entirely absent.

Stiff neck occurred as frequently as vomiting, and following that, *pains* in back, neck, and limbs. 38 per cent. of the patients who had all these symptoms died. A marked difference between the frequency of Kernig's sign, Babinski's sign, and tache cerebrale was observed. In the early stages of the disease, *Kernig's sign* was frequently either absent or indistinct, but it became a marked symptom by about the end of the first week. In some cases it was never obtainable. There is a tendency to regard *any* difficulty in extending the legs upon the flexed thigh as constituting a definite Kernig's sign. This is not so. Kernig's sign cannot be considered as definitely present if the leg can be extended nearer than 30° to the vertical line, with the thigh flexed at right angles to the body. Twenty convalescents—not cases of cerebro-spinal fever—were made to lie flat on the back, the thigh flexed at right angles to the body; in only one case could the leg be raised in line with the thigh; it two it could be raised to within 10° to the vertical line. In the remaining 17 cases the average to which the leg could be raised was between 15° and 20° from the vertical line.

Babinski's sign when present (4 cases) was generally observed in the early days of the disease. *Tache cerebrale* was not very frequently present, but was almost always very definite in the cases that showed it. *Sore throat* was not so common as would have been expected, and *nasal catarrh* also only occurred in a like number of cases (5).

The *abdominal reflexes* were increased in 7 cases, and in 10 diminished or sluggish. In one of the cases of *panophthalmitis* (the fatal case) this condition had existed a fortnight previous to the onset of the disease. The eye had been enucleated in consequence. *Incontinence* of urine was several times followed by retention.

In one case that recovered it appeared that the patient had just finished a course of treatment for syphilis (? with salvarsan); this did not appear in any way to affect either the symptoms or progress of the disease. *Synovitis* was not so frequent a complication as might have been anticipated. It was only noted in 8 cases.

The *fainting attacks* noted in one case were persistent during convalescence. No cardiac lesion was detected. *Hydrocephalus* was found twice post mortem. In one of these cases the patient improved so much that he was allowed up on the fifty-sixth day and seemed to be going on well; later, however, there was recurrence of vomiting and other symptoms, and he died on the seventy-third day. The other case was that of a man who was kicked on the head by a horse and removed to hospital. Later the usual symptoms developed and he was transferred to the Isolation Hospital, where he died on the sixty-sixth day.

In one of the cases of *paraplegia* there was a marked area of complete anæsthesia extending up to the umbilicus. Above this was a zone of hyperæsthesia extending to the 8th rib. These zones fell about 2 inches in the course of a few days, but had not wholly disappeared when he died.

Rashes of different kinds were observed in 58 cases, small and purely local eruptions of herpes not being included in the calculation. Some patients had more than one kind of rash—i.e., a general herpetic eruption which faded and was succeeded by a petechial and hæmorrhagic rash. In 42 cases no eruption other than a trifling and transient herpes was observed; of these, 28 recovered and 21 died. The hæmorrhagic eruptions varied considerably; in some instances there was a mixed semi-petechial rash, varying in size from a pin point to spots as large as a shilling, with mottling of the skin; again, one case developed large plum-coloured bullæ limited to the backs of the hands and arms, and the third had a considerable prune-coloured eruption. Some rashes were discrete and others general and confluent.

One condition not included in the table as a symptom was noted as more constant than any other—i.e., *restlessness*. This condition seemed most marked in the early and middle stages of the disease, and the notes teem with reference to it. "Very restless," "Restlessness continues," "Another very restless night" are common observations. There were few cases in which the opposite condition obtained, the patient lying drowsy, or lethargic, not speaking unless spoken to, and confining his answers to monosyllables.

Temperature and Pulse.

Temperature in the initial stage—i.e., at the time of admission—was frequently about 101° F. In two of the

cases it was subnormal and in the bulk of cases was never very high. In some instances it dropped within a few hours to normal, and slightly varied between normal and subnormal to the end. In others the variation was markedly up and down, dropping on one day to 97° and rising on the following 104°. Almost always there was a remission about the fifth or sixth day, succeeded by a secondary rise, and this holds good both in cases that recovered and in those that proved fatal. In two rapidly fatal cases the initial temperature was high—103·6° and 105° respectively—and then came down quickly prior to the fatal termination. In another fatal case it rose by steps with intervening remissions to 101°, 102°, 103°, and 106·4°, when death took place. The highest recorded temperature was in a fatal case immediately before the end and was 107°, and the lowest, also in a fatal case, and immediately before death was 96°.

The pulse-rate presents few special features, but there is some evidence in several of the cases of a vagal influence on the pulse.

In one case the temperature on admission was 102° F. and the pulse 84; with the exception of two separate rises the temperature kept slightly above or below normal, the pulse ranged between 48 and 60, but on the two occasions when the temperature rose to 101° the pulse was only 68 and 60 respectively.

In another fatal case the temperature on admission was 104° and pulse 84, subsequent rises to 102·4°, however, were accompanied by pulse-rates of 72 and 68 respectively.

Again in a case with a temperature of 101·4° on admission, and pulse-rate of 76, a subsequent rise to 103° was accompanied by a pulse-rate of 68 only.

This was not consistently so, however, for in a case with admission temperature of 102°, and pulse-rate of 88, there were subsequent rises to 102°, with pulse of 80, 103° pulse 88, 102° pulse 72, 103° again pulse 88, and the last temperature before death was 103·8° and pulse of 96.

In a case with temperature on admission of 100·4°, there was a pulse of 124. The temperature rose rapidly to 103·4°, the pulse rising to 144; the temperature then dropped to 100°, pulse to 110, and although the temperature subsequently mounted to 101° and 102°, the pulse fell to 96 and 92 respectively; a final rise to 103° immediately prior to death was accompanied by a pulse of 144.

In another fatal case the temperature on admission was 98°, pulse 86. Both then went up, the temperature to 101·8° and the pulse to 110. Temperature then fell to 99·6°, pulse 91; to 99°, pulse 120; rose to 102·4°, pulse still 120; fell to 99·6°, pulse still 120; and finally rose to 103·6°, pulse 144.

In a case with temperature on admission of 101° and pulse 76 a rise to 102·4° was accompanied by a pulse of 64. Temperature then fell to 98·2°, with pulse 88; then 99·4°, pulse 64; 100·8°, pulse 66; 102·4°, pulse 80; 104·4°, the pulse then rose to 136, and although the temperature came down before death to 101°, the pulse-rate steadily increased to 168.

In yet another case the temperature on admission was 102°, pulse 70. Keeping above normal, the temperature fluctuated considerably, falling at intervals to 97·6°, but generally ranging between 100° and 102°. The pulse-rate during the first few days ranged between 70 and 96, being 92 with a temperature of 103·6° on more than one occasion. The case ended fatally on the fourteenth day with a temperature of 99°, but the pulse-rate was then up to 180.

Two cases were found post mortem to be *hydrocephalic*.

One was the case before mentioned of a man well overnight and found unconscious in the morning. The duration of the disease, apparently, was only three days; the temperature on admission was 102° and the pulse 140. The temperature rose to 103°, pulse 140, and then fell to 102·2°, pulse rising to 152, which was the condition at death.

In the other case, duration 73 days, the patient had a temperature on admission of 101·4°, and pulse 76. The temperature fluctuated for several days between 98° and 103°. The pulse-rate at the same time ranged between 64 and 104—the latter once only—with a mean of 80. The temperature then came down to normal and slightly subnormal for 58 days, the minimum subnormal being 98·2°, with two exacerbations of 100·4° and 101·4° respectively. The pulse meanwhile ranged for some days between 80 and 96, then for over a week between 70 and 88, and towards the end between 52 and 60. With the two temporary rises the pulse was each time 96.

Two other cases are of interest in connexion with the pulse—viz., two fatal cases in which post mortem the *suprarenal glands* were found to be hæmorrhagic; both cases were of short duration, three days only and seven days respectively. In the one case the temperature on first day was 103°, pulse 98, 120; second day, temperature falling from 101·8° (pulse 100) to 98° (pulse 134, 148); third day, temperature rose to 107°, pulse 164, before death. In the other case the temperature was mostly normal, with two rises to 101° (pulse 68) and 103° (pulse 100) on first and third days, and a rise on eighth day to 105° (pulse 70, 132) before death. Pulse on other days was 52 to 90, with temperature nearly normal.

Treatment.

All ordinary conditions, such as constipation and the like, were treated with the usual remedies. The restless and excited condition and sleeplessness by morphia, chloral, and bromides. Urotropin was frequently used and apparently with benefit. Paraldehyde was occasionally employed.

The principal line of treatment was lumbar puncture and the injection of antimeningococcic serum (MacConkey's and French serum were principally used in 10 to 30 c.cm. doses). During a short period, while serum was not available, lumbar puncture and the withdrawal of any cerebro-spinal fluid that was under pressure were all that could then be done. In two of the 40 fatal cases there was lumbar puncture only, but both cases were of sudden onset and rapidly fatal, and the patients in articulo mortis on admission.

An analysis was made of the number of lumbar punctures, the number of times serum was injected, and the results.

Cases without serum: 20 cases; 13 r., 7 d. With one injection: 17 cases; 10 r., 7 d. Two injections: 20 cases; 15 r., 5 d. Three injections: 8 cases; 3 r., 5 d. Four injections: 10 cases; 8 r., 2 d. Five injections: 5 cases; 2 r., 3 d. Six injections: 4 cases; 1 r., 3 d. Seven injections: 4 cases; 3 r., 1 d. Nine injections: 2 cases; 1 r., 1 d. Ten injections: 1 case; d. Twelve injections: 1 case; r. No lumbar puncture: 8 cases; 4 r., 4 d.

The rates were considered in two ways: (1) in relation to the number that had serum, and (2) in relation to the total number of punctures. In one case the cerebro-spinal fluid removed amounted to 1346 c.cm. (590 c.cm. in 17 days); the largest amount withdrawn at any one time was 116 c.cm. Under treatment the patient improved, but ultimately relapsed and died. Nearly all the lumbar punctures were done under a general anæsthetic, chiefly chloroform. In the one mishap the patient was only partially under the anæsthetic when he had a convulsion and the heart stopped. All appropriate measures were without avail.

Of the total number who had no lumbar puncture or injection of serum (8), half recovered and the others died. The figures do not indicate any definite advantage from repeated injections of serum, but it was felt that early and repeated lumbar puncture and injection of serum afforded the best chance of recovery. The statistics may not indicate this, probably because, among other things, they cannot show the severity of the attack or virulence of the infection. In a bad case, with an infection of the type so fatal in this series (Type 2), repeated punctures and injection of serum might fail to cure. On the other hand, undoubted benefit, remission of symptoms, and abatement of the disease was traceable to this form of treatment.

Colonel Carter's own note is to the following effect. "Chief reliance has been placed on early and frequent lumbar puncture, so long as the cerebro-spinal fluid continues to be turbid. When the fluid has become clear and limpid no further puncture is usually needed unless the quantity is large, when it may be repeated at considerable intervals. Other than the quantity and character of the fluid headache has been the principal indication for repetition of lumbar puncture, especially when severe and persistent. Recurrence of pyrexia after the temperature has fallen (especially in association with headache) should probably always be regarded as an indication for puncture, but a low temperature when associated with deterioration in the general condition may call for such interference. A review of my cases established beyond question the importance of beginning treatment by lumbar puncture as early as possible in the course of the disease, and repeating it daily until the principal symptoms have begun to abate."

Types.

The particular type of meningococcus was identified in 43 cases. Type 2 (22 cases) was the most prevalent type and also the most fatal, there being 13 deaths among those in whom this type was identified. Next came Type 1 (16 cases)

with 4 deaths. The majority of those cases of Type 2 which proved so fatal came from Fargo Camp during the months of December, 1916, and January, 1917. The number of cases of Type 3 was 1 (r.), and of Type 4, 4 (2 r., 2 d.)

Duration.

The average duration of the disease was 36·12 days. The average duration of the British cases that recovered was 58·17 days; of those that died, 35·08 days. Among the colonials the average duration was 37·3 days and 16·3 days respectively. It would appear that in the overseas troops recovery or death took place sooner than in the British. The duration has in every case been computed from the date taken as that of the onset of the disease to the date when the patient was either discharged from hospital to convalescent camp or died.

Anomalous Cases.

Four cases have already been mentioned as proving other than cerebro-spinal fever.

One patient was admitted with pains in back of head and in abdomen and legs, sore throat, slight fever, and general malaise; the reflexes were sluggish, no Kernig's sign could be elicited. He was recovering from an attack of gonorrhœa when the other symptoms supervened. On the second day, his condition remaining the same, he was punctured, and 30 c.cm. of fairly clear cerebro-spinal fluid withdrawn; this contained a few polymorphonuclear cells and numerous gonococci, some of the latter being intracellular. His recovery was uneventful.

In another case the patient was dazed, had severe headache, stiff neck, vomiting, definite Kernig, temperature 100·4° F., pulse 104. A petechial eruption over back and limbs. Some of the spots being hæmorrhagic. There was a history of an attack of cerebro-spinal fever 15 months previous, from which he had completely recovered. He was punctured four times, the cerebro-spinal fluid removed was at first turbid, later becoming more clear. It contained no meningococci at any time, but abundant pneumococci.

Two other cases presenting the usual symptoms of cerebro-spinal fever were ultimately considered to have been influenza. The attacks were not very serious, the progress and convalescence were rapid, and at no time was the cerebro-spinal fluid positive. Moreover, there was an epidemic of influenza prevalent at the time, especially among the colonial troops in the area.

Conclusions.

Consideration of the facts in connexion with this series of cases leads to the following conclusions:—

1. The average age was 23·05 years. The average age of the overseas men was rather higher than the British.

2. Certain camps, without a necessarily larger body of troops present, furnished a larger number of, and more fatal, cases spread over the whole period. No satisfactory reason for this is forthcoming.

3. No seasonal or meteorological condition can be shown to have influenced the incidence- or death-rate, save that the larger number of cases occurred in the three winter months of December, January, and February.

4. No single symptom can be considered pathognomonic of the disease, and even a combination of the principal usual symptoms may not be positive. A positive bacteriological finding is alone conclusive.

5. No treatment appears to be so effectual as early and continued lumbar puncture and injection of serum. Wherever possible a serum of the particular type affecting the patient is preferable.

6. The most frequent and the most fatal type was Type 2.

7. The average duration in all cases was 36·12 days. The average duration was less in the case of overseas men, whether they recovered or died, than in the British.

I have to thank Major A. G. Gibson, R.A.M.C. (T.), for kind permission to publish these notes and for the provision of valuable data in connexion therewith.

FOREIGN DECORATION.—The Cross of Chevalier of the Order of the Crown has been conferred upon Major R. A. Farrar, R.A.M.C., by the King of Belgium in recognition of services rendered in aid of the Belgian refugees.

A BALL in aid of King's College Hospital Clubs and Societies Union will be held at Prince's Galleries, Piccadilly, on Monday, June 30th, and it is hoped that the occasion will also serve as a post-war reunion of old King's men. Tickets, one guinea each, can be obtained from the dance secretary, King's College Hospital, Denmark Hill, London, S.E.5.

ANÆSTHESIA FOR OPHTHALMIC OPERATIONS:

SOME POINTS IN TECHNIQUE.

BY CHARLES T. W. HIRSCH, M.R.C.S., L.R.C.P. LOND.,
CAPTAIN, R.A.M.C. (T.C.); ANÆSTHETIST, MILITARY ORTHOPÆDIC, KING GEORGE, SAMARITAN, AND WESTERN OPHTHALMIC HOSPITALS, ETC.

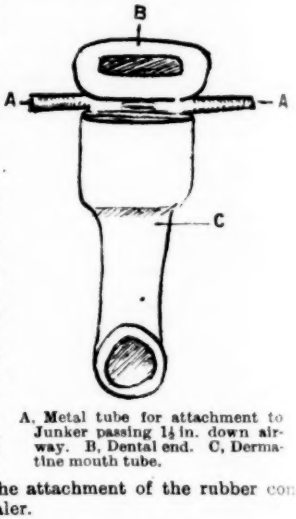
IN all operations the anæsthetist is appreciated in proportion to his effacement. This is essential in eye work, where the fields of operator and anæsthetist rather encroach on one another. In this, as in all anæsthetic work, the general principles apply—that is, correct preparation of patient, preliminary narcotic, slow gradual induction, free air-way, and uniformity of anæsthesia. Chloroform is the ideal anæsthetic, unless there are special contra-indications.

Preparation of Patient and Induction.

Preparation of patient.—Bowels to be cleared by medicine given on the second night before the anæsthetic is administered, and enema on morning of operation. The last meal, five or six hours before the anæsthetic, should consist of either broth, meat jelly, or soup free from fat. Milk is undesirable.

Preliminary narcotic.—I prefer morphia 1/12 gr. and atropine 1/100 gr., given 20 minutes prior to operation.

Induction should be slow and gradual, eight to ten minutes. This can be obtained by the Schimmelbusch mask and drop bottle; personally I prefer a percentage inhaler, such as I described in THE LANCET of April 1st, 1916. A mouth prop should be introduced before starting induction. As soon as the patient is under, an air-way with a lateral tube should be put in, care being taken that the tongue is under the tube. If a prop has been used this can be done without using a gag. The air-way, illustrated, is a modification of Hewitt's, but has a flat metal dental end, B, with a tube on either side for the attachment of the rubber connexion from a Junker inhaler.



A. Metal tube for attachment to Junker passing 1¼ in. down air-way. B, Dental end. C, Dermatine mouth tube.

Maintenance of Uniform Anæsthesia.

When the patient is deeply under, corneal reflex almost abolished, the mask or face-piece can be removed. The anæsthesia can be maintained by a hand or foot bellows pumping air through chloroform in the Junker inhaler and thus by a rubber tube to the lateral metal attachments on the air-way. One hand can be placed under the chin. Sterile towel loosely covers this as well as the patient's mouth and nose. If the anæsthetist stands at the side the operator will have the whole field to himself.

The hand below the mouth will detect that the patient is breathing regularly. The colour should be normal throughout. The slightest cyanosis is an indication to stop immediately the anæsthetic, turn head to side, and drain or clear out any cause of respiratory obstruction. With proper preparation and preliminary narcotic this should not occur. As in all anæsthetic administrations, but especially with chloroform, the slightest respiratory obstruction may be most serious. A free air-way and a good colour indicate safety.

A similar procedure can be utilised for *nasal operations*, such as submucous resections, &c. In these the anæsthetist is best stationed at the patient's head, the hand supporting the chin being covered and hidden by sterile towels. The anæsthesia in these cases must be very light and the cough reflex retained.

Ether can be used, and after the usual induction can be continued by either the intratracheal or Kuhn's tube. Or air

can be pumped through ether in a Woulfe's bottle, warmed by passing through a coil in a thermos flask, and finally passed into the patient's mouth through the air-way's lateral attachment.

In lieu of the air-way a mouth prop with a tube perforating it can be used. The air-way is preferable as by it the tongue is kept from falling back.

Hyde Park Gate, S.W.

DIAPHRAGMATIC HERNIA,

WITH REPORTS ON TWO CASES.

BY RICHARD WARREN, M.D., M.CH. OXON., F.R.C.S. ENG.,

SURGEON, LONDON HOSPITAL; SENIOR SURGEON, EAST LONDON HOSPITAL FOR CHILDREN.

HERNIA of abdominal viscera through the diaphragm is tolerably rare, but likely to be more common in future as a late result of battle wounds. I have had two cases under my care in this hospital recently, and assisted a colleague with another in France. The records of this hospital show four cases in the past ten years, making a total of seven—sufficient to provide food for discussion.

Ætiology.—The age varied from 16–68. Injury plays an important part. Three cases were the result of gunshot wounds of the chest and abdomen, a fourth had suffered from fractured ribs on both sides in a buffer accident. Of the other three, two were young people—16 and 30—with no history of injury, and probably due to congenital defects; the last case was a female of 68 with a long history of wasting and vomiting, no note of injury, and so may also have been of congenital origin.

Position of hernial orifice; contents of hernia.—In four cases the opening was about two inches in front of the œsophageal opening: in one case the opening was an enlarged œsophageal opening, in the other two position is not mentioned.

In 3 cases the contents of the hernia were stomach, in 2 large gut, in 2 small gut.

In 5 cases there were acute obstruction and strangulation, in 1 case subacute obstruction of a recurrent type, in 1 case no obstruction but an associated pyloric ulcer, laparotomy for which led to discovery of the more rare condition.

Diagnosis.—In most of the cases this was only made during a laparotomy for treatment of the obstruction, or in one case to treat a pyloric ulcer. In one case the combination of signs of acute obstruction, with a retracted empty abdomen, a small old wound in the mid-axillary line and a large well-healed laparotomy scar rendered the diagnosis of diaphragmatic hernia very likely, but examination of the chest showed nothing definitely abnormal except some doubtful tinkling sounds heard over the left chest on one occasion. Displacement of the heart was not definitely ascertained in any case. Examination of the chest was in all cases rather cursory as the attention was mainly directed to the severe intestinal obstruction, nor was there opportunity for careful examination by X rays with opaque meals, &c. Exact diagnosis, in fact, is not likely to be made in the urgent cases which appear to be those more commonly met with, but in the abstracts of the two cases which follow it will be seen that there are some points worthy of attention.

Notes of the Two Cases.

CASE 1.—Patient, aged 59, male, was admitted in January, 1919, with intestinal obstruction. He complained of pain in the lower abdomen for a week with copious vomiting and inability to pass flatus. The patient had been getting thin for 2–3 years. About three years ago he was crushed between buffers and stated that his lower ribs were fractured on both sides. On admission he was very ill, with marked abdominal facies. T. 96° F., P. 104, R. 24. There was a large resonant swelling of pear shape in the epigastrium, large end uppermost. A splash was elicited on palpating this swelling. The lower abdomen was quite hollow and retracted. Heart and lungs clear. Nothing felt per rectum.

Laparotomy revealed a curious condition: the small intestines were contracted and tiny, the stomach acutely dilated, but the pylorus and duodenum could not be found. The stomach was emptied of gas with a trocar, and it was found that the pylorus and part of the stomach and duodenum had passed through an opening in the diaphragm. A stomach-tube was passed and the stomach further emptied, when it was possible to pull down the pyloric part of the stomach with pylorus and duodenum through the aperture in the diaphragm. A very distinct pressure ring was noted on the stomach where it had been compressed by the hole in the diaphragm. The hernial orifice admitted three fingers easily and was immediately in front of the cardiac end of the stomach and œsophagus which formed its posterior wall. Fingers in the sac felt the heart beating in front. The hernial ring was closed with a strong purse-string suture and the abdomen closed; operation lasted 30 minutes.

The patient, who was severely shocked before the operation, stood it well, but did not rally, and died 26 hours after. As he had been ill a whole week before coming under surgical treatment this is not surprising.

CASE 2.—Patient, male, aged 23, admitted in February, 1919, complained of pain in the right chest for six days with constipation. Vomiting had commenced three days before and had become more urgent, and finally brown in colour, but not fæculent. In 1916 he had sustained a gunshot wound in France. The entry wound was in the left mid-axillary line about the nipple level. A laparotomy had been done in France and, as appeared later, the spleen removed. Both wounds were well healed.

On admission patient was collapsed, sunken-eyed, with dry tongue. P. 112, T. 97·6°. The chest was resonant, vocal resonance, breath sounds heard all over. Once it was thought that tinkling was heard over the left chest. The heart was not obviously displaced, but the apex beat was rather diffuse and there was some dullness to the right of the sternum. The abdomen was greatly retracted and hollow, resembling the condition of an advanced obstruction of the œsophagus; there was no rigidity or tenderness.

Laparotomy was performed through the old scar. The small gut was empty and contracted, the stomach and pylorus had disappeared. Tracing the jejunum upward it was found that the stomach and most of the duodenum had passed through an aperture in the tendinous part of the diaphragm into the thorax. Some omental adhesions about the opening made matters rather obscure at first. An examination about the splenic flexure of the colon showed that the spleen had been removed. The constriction at the aperture in the diaphragm was tight and was divided with hernia knife and director. When this was done the duodenum, stomach, and omentum were pulled down, the stomach being moderately dilated; omentum adherent round the aperture was freed, and the aperture was found to extend back from the tendon of the diaphragm to the œsophageal opening. The opening in the diaphragm was closed with a purse-string suture and the abdomen closed, taking 35 minutes in all.

The patient made an uninterrupted recovery: the only one of the seven who survived.

It may be noted that in both these cases closure of the aperture in the diaphragm was fairly easy, since the obstruction was very high up and as there was no distended small gut to obstruct the passage of the needle.

Another Case: Value of Early Diagnosis.

Since writing the above an eighth case came under observation a few days ago.

The patient was also an ex-soldier of about 30, with a healed E. and E. wound of some standing passing from the left mid-axillary line to the left side of the spine rather below the nipple level. This patient had been vomiting for a whole week before he was sent up and arrived moribund and pulseless, with urgent vomiting, Hippocratic facies, subnormal temperature, and a very retracted but soft abdomen. This condition, and the position of his old wound, rendered the diagnosis of strangulated diaphragmatic hernia very probable. He was quite unfit even to be moved to the theatre, much less for operation, and in spite of stimulant, infusion of morphia, &c., did not rally at all, but died in 3 or 4 hours.

Post mortem a large hole was found in the diaphragm just in front of the œsophagus, into which all the stomach, except a small part of the cardiac end, as well as an inch of duodenum and a loop of transverse colon, had escaped. If only he had been sent up a few days earlier his life would almost certainly have been saved.

It is hoped that the publication of these cases will render practitioners alive to the likelihood of diaphragmatic hernia in patients with old wounds of the lower thorax, and it may be specially noted that though the general signs of intestinal obstruction—viz., urgent vomiting, collapse, and inability to pass flatus—are manifest the abdomen is not only soft and not tender, but even markedly hollow and retracted

Weymouth-street, W.

RESULTS OF

BONE-GRAFTING OPERATIONS

IN THE TREATMENT OF UNUNITED FRACTURES OF THE MANDIBLE.

BY W. MAXWELL MUNBY, CH.M. EDIN., F.R.C.S. ENG.,
CAPTAIN, R.A.M.C. (T.);

AND

A. D. E. SHEFFORD, L.D.S. ENG.,
CAPTAIN, R.A.M.C. (DENTAL OFFICER;
DEPARTMENT FOR TREATMENT OF INJURIES TO THE FACE AND JAWS, 2ND NORTHERN GENERAL HOSPITAL, LEEDS.

THE treatment of ununited fractures of the mandible by bone-grafting operations has recently been discussed by the Odontological Section of the Royal Society of Medicine. It would seem very desirable that as many results as possible of such operations should be published, so that some more definite conclusions may be reached as to the success likely to be attained, especially in view of the fact that repatriated prisoners of war and pensioners suffering from this disability are frequently admitted to centres dealing with jaw injuries. With this intention we are making the following statement of the results obtained in those cases so treated at this hospital.

Present Series.

The cases which form this series were, with one exception, all operated upon during the past year, whilst the results shown are those obtained at periods varying from six to ten months after operation and when these patients were discharged from hospital. The one exception was our first case, operated upon three years ago. The lack of the necessary appliances, together with the difficulties under which the operation was conducted, and the unsuccessful result obtained did not encourage us at that time to continue with this method of treatment.

The cases of ununited fractures of the mandible, the result of gunshot injuries, treated here are divisible into two classes: (1) those having teeth in both fragments; (2) those having no teeth in the posterior fragment.

The *origin of the graft* has differed; in our earlier cases (Nos. 1 to 10) the free graft was invariably used, whilst in the later cases (Nos. 11 to 17) we have adopted a pedicled graft from the mandible, as introduced by Mr. Percival Cole. In the former instances the graft was obtained from the crest of the ilium, in all but the first and last which were tibial and mandibular grafts respectively. The methods of fixation of the graft have been various.

Method of Immobilising the Fragments.

The cast metal cap and bar splint has been used in every case. Cemented to the teeth of the mandible (displacement having been reduced and normal occlusion restored whenever possible) and those of the maxilla, these splints are united firmly together, the "bite" being kept open to the extent of about half an inch. In the later cases these splints have been rendered separable, the one from the other, by means of removable screws working in flanges attached to the splints of both upper and lower jaws separately. These flanges fit closely together in order to prevent any possibility of movement. This practice has been found advantageous to the anæsthetist, and is also of great value in cases of any immediate post-operative complication. In those cases where the posterior fragment is without teeth the progress of union can be tested clinically by separating the splints temporarily.

In none of these cases have we attempted to control the loose posterior fragment by any appliance when it has been devoid of teeth.

The splints are worn from three to four months after operation before being removed. In cases of imperfect union being present on removal of the splints, which we have invariably found to be the case when free grafts were used, either a cap and bar splint is adjusted to the teeth of the mandible for a further period or dentures have been adapted. The latter have a definite stabilising effect, especially where teeth are present in both fragments. Ultimately at the end of from six to nine months either complete union has resulted or the condition has greatly improved.

In the case of pedicled grafts the condition upon removal of the splints has been one either of absolute firm union or very slight mobility, causing little or no disability. In the latter case complete immobility usually results in a very short period.

In no case was the operation performed until at least seven months after injury nor until other treatment had been carried out for five or six months. The external wounds in all cases have been healed completely for at least four months prior to operation.

Operative Technique.

A curved flap, including the platysma muscle, with its centre opposite the site of fracture is turned up, exposing the outer aspect of the bone as far up as necessary.

In those cases where a free graft is to be used, the ends of both fragments are sufficiently freed to allow the removal of enough bone to expose the medullary cavity by means of the electric saw; any fibrous tissue between the fragments is also removed. An incision is then made over the crest of the ilium, the muscular tissue detached, and a piece of bone of sufficient length to fill the gap between the mandibular fragments removed. This piece, with its attached periosteum, is then wedged, if possible, into the medullary cavity, or fixed by means of thick catgut ligatures to each end of the fragments. Deep sutures of fine catgut are used for approximating the soft tissues and the skin is sutured without drainage.

Where a pedicled graft is used the preliminary steps are the same as for a free graft. The ends of the bone having been exposed, an incision is made through the periosteum covering the outer surface of the mandible about 1 cm. above the lower border of that fragment from which the graft is to be taken. From this fragment a piece of bone slightly larger than the gap it is to bridge across is cut off by means of the electric saw and a muscle pedicle is freed sufficiently to allow of the graft being readily moved, without tension, into the gap. A notch is cut with rongeur forceps in the lower corner of the free end of the other fragment, and the graft is moved into position. It may be fixed with fine catgut sutured through periosteum, or by means of silver-wire threaded through the body of the bone and the graft.

Unless there is considerable oozing, drainage is better dispensed with and the wound closed by interrupted sutures. Perhaps it is hardly necessary to state that the oral cavity must not be penetrated.

Conclusions.

1. Bone-grafting operations give the best results when there are teeth in both fragments, which can then be completely controlled by a splint. In 9 cases of such a nature, all with the exception of our earliest one, were united at the end of ten months, giving 89 per cent. of complete successes.

2. In those cases where there is an absence of teeth in the posterior fragment the operation is only indicated when the pseudo-arthrosis is very lax, and marked improvement can be obtained, even if union of the graft is imperfect. Where there is already firm fibrous union causing little or no disability, the operation is not indicated. There were 8 such cases in this series, in 2 bony union was obtained, 3 were considerably improved, 1 slightly improved, and 2 remained in statu quo.

3. Better results are obtained by the use of pedicled grafts than by free grafts in that the former considerably shorten the period between the actual operation and the establishment of union. In this series, when teeth were present in both fragments, union was obtained in all but one case on the removal of the splints, three months after operation when the pedicled graft was used. Where there are no teeth in the posterior fragment the best results are also obtained by use of the pedicled graft. In one case bony union was obtained, and in the second there is considerable improvement, which may ultimately result in bony union.

4. Certain cases where there is a large gap between the fragments are not suitable for a pedicle graft, especially when both ends of the fragments are pointed. In such instances a free graft is preferable. In free grafts the best results are obtained when the graft can be wedged into position and the periosteum stitched with fine catgut.

5. Absence of wound infection is an essential in order to secure satisfactory results. In three successive cases in this

series, where kangaroo tendon was used for fixing the graft, some infection of the wound occurred, and although its degree was not severe and the graft was in no case extruded, yet in two instances no improvement resulted, and only to a slight degree in the third. Radiographic examination showed that these grafts were slowly becoming absorbed.

6. The amount of scar tissue present in the area of operation does not appear to influence the result, except that a slight sloughing of the skin flap may occur when it is abundant.

7. Radiographs in fractures at the angle region of the mandible are deceptive, inasmuch as they do not show the true extent of the size of the gap, which is frequently greater than it would appear owing to the fact that the posterior fragment generally becomes displaced inwards and lies at a deeper plane than the anterior.

Analysis of Results.

—	Union	Improvement.	No improvement.	Total.	Bony union
1. Teeth in posterior fragment	8	Nil.	1	9	89%
2. No teeth in posterior fragment	2	4	2	8	25%
Totals..	10	4	3	17	59%

The results in the pedicled graft cases show 5 in Class 1, all united, and 2 cases in Class 2, 1 united and 1 much improved. [A table of cases was here given in support of the statements in the text.]

In conclusion, we wish to thank Lieutenant-Colonel H. Littlewood, C.M.G., the administrator of this hospital, for his encouragement and invaluable advice in our work; Captain F. J. Stansfield for his assistance as radiographer; and our dental colleague, Captain J. W. Mawer, for his help.

NOTE ON
PSEUDO-PARATYPHOID FEVER.

BY RICHARD PATON, M.B., CH.B. GLASG.,
CAPTAIN, R.A.M.C.

DURING the early part of the summer of 1918 a small epidemic of enterica broke out amongst the German prisoners of war interned at Meadi, near Cairo. There were 21 cases in all, including typhoid (13), paratyphoid A (1), paratyphoid B (3), and pseudo-paratyphoid (4).

The four cases of the last group are worthy of note. Blood cultures in nutrient broth and bile were made, and in three cases motile coliform organisms were grown giving the sugar reactions of the paratyphoid group and agreeing with that group in all particulars except agglutination properties. In the fourth case a similar organism was cultivated from the stool of the patient. Agglutination of these organisms was attempted with the stock sera of the Royal Army Medical College and Lister Institute, and proved to be negative for typhoid, paratyphoid A and B, and also *B. enteritidis* of Gaertner. On the other hand, the patient's own serum caused agglutination in dilutions of 1 : 400 on Garrow's agglutinometer. Using the sera of the other enterica patients in hospital against the bacillus isolated from these cases, there was no agglutination in 1 : 20 dilutions, and a similar state of affairs occurred when the pseudo-paratyphoid patients' sera were used to agglutinate stock cultures of T., para. A and B; thus the group agglutinin is of a very low titre. Whilst investigating the probable source of the epidemic a similar pseudo-paratyphoid organism was isolated from the stools of a German who had no history of enterica or dysentery, and as such was employed as a kitchen worker, and also *B. typhosus* from one giving a similar history.

The fever as observed here (Charts 1, 2, and 3) is of about 14 days' duration. There is a step-ladder rise till the seventh day, when the temperature reaches 104° or 105° F. and then a gradual decline to normal about the twelfth day. The pulse-rate is not proportionately increased and the respiration rate is unaffected. The fever is ushered in with shivering and headache, also slight cough. Slight diarrhœa and some abdominal pain occurred in all the cases. The heart and lungs were normal and the abdomen somewhat

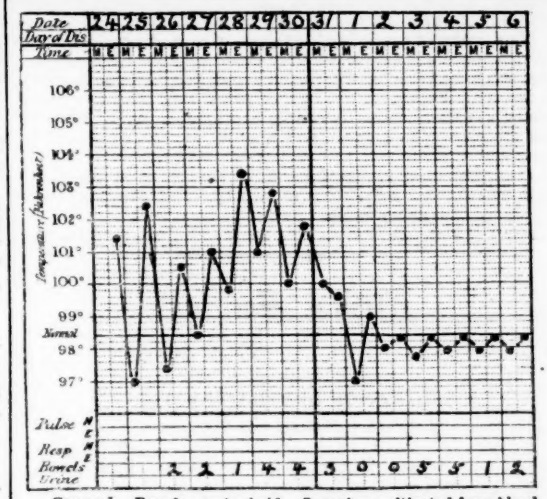


CHART 1.—Pseudo-paratyphoid. Organism cultivated from blood on May 30th.

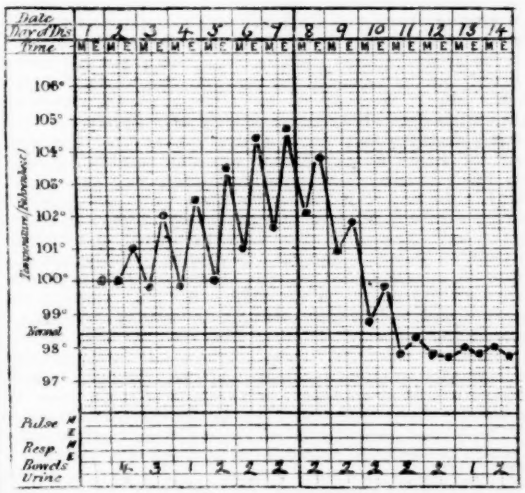


CHART 2.—Pseudo-paratyphoid. Organism cultivated from blood on eighth day.

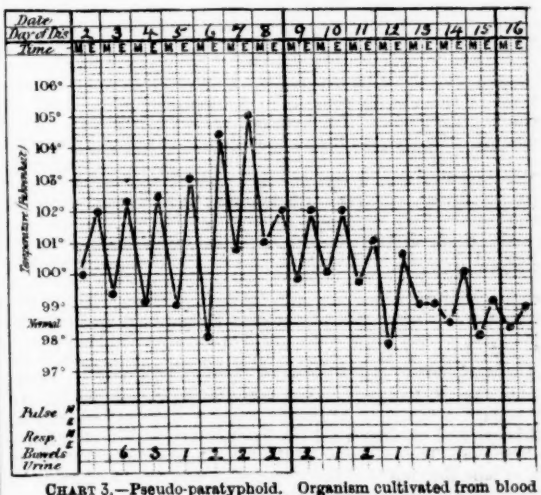


CHART 3.—Pseudo-paratyphoid. Organism cultivated from blood on eighth day.

tumid. There is no note in the clinical histories of any splenic enlargement, nor was any rash observed.

This group of cases is of interest from a diagnostic point of view insomuch that at no time would their sera agglutinate the stock cultures of T., para. A and B, and enteritidis of Gaertner. Fortunately blood cultures were obtained early enough in these cases to enable a diagnosis to be made of pseudo-paratyphoid fever and also to segregate one carrier case.

I am indebted to Lieutenant-Colonel R. S. Vickerman, O.B.E., O.C. No. 2 Prisoners of War Hospital, for permission to publish the above cases.

Pathological Department, No. 2 Prisoners of War Hospital, E.E.F.

Medical Societies.

ROYAL SOCIETY OF MEDICINE.

SECTION OF OPHTHALMOLOGY.

Exhibition of Cases and Specimens.

AN ordinary meeting of the section was held on Wednesday, June 4th, under the presidency of Mr. W. T. HOLMES SPICER.

Mr. J. HERBERT FISHER exhibited, by means of the epidiascope, a drawing through the centre of the optic chiasma, to show the pedicle of the pituitary body and the intimate relationship between the lateral boundary of the pituitary body and the inner wall and internal carotid artery. This artery, having come forward in the floor of the cavernous sinus, made a bend with its convexity forwards as it ascended to pass on the mesial aspect of the clinoid process on its anterior aspect. It also showed the ophthalmic artery coming off. Mr. Fisher considered that if there were a swelling of the pituitary body, of either a transient or permanent nature, it was very likely to cause an immediate effect on the carotid artery in the way of indenting its inner wall and so interfering with the blood flow, and producing thereby an effect on the cerebral, and possibly also the retinal, circulation. This section seemed to support the view he recently brought before the members, that possibly an abnormal state of the pituitary body might be responsible for some varieties of migraine, and explain such attendant symptoms as aphasia. Some further support was derived from the fact that during an attack of migraine it was common for the superficial temporal artery to be tense and cord-like. If the enlarged pituitary caused compression, as he suggested, then more of the blood brought up the neck by the common carotid must be diverted and fill up the branches of the external carotid, of which the temporal artery is the most easily investigable.

Mr. L. V. CARGILL showed a case of Pigmented Connective Tissue in Front of the Optic Disc of the Left Eye. When this soldier was in France he was struck in the face by shrapnel in 1918. As the man was complaining of blindness his condition was described there as evulsion of the optic nerve. It did not have that appearance, however. The history showed that the man had had no vision in that eye before he was recruited. The disc of the left eye was practically hidden by this mass, which projected beyond the level of the fundus some 3 to 5 dioptres. From some of the radiating white streaks blood-vessels could be seen to emerge. He thought it must be due either to some defect of a congenital nature, to trauma, or to inflammatory change. His view was that it was due to a hæmorrhage, which might have occurred at birth. Obviously it had no relationship to the facial injury by shrapnel.

Mr. F. A. JULER showed a patient with Obstruction of Retinal Vessels, with patent vessels, following an electric flash. This case of embolism of the central artery of the retina showed some unusual features. The part of the retina on the outer side of the disc looked healthy and was not opaque, and there was a small cilio-retinal vessel supplying this part of the retina. With regard to the nature of the obstruction, the man had an extensive heart lesion, which Dr. F. Langmead regarded as probably congenital. At this date, a fortnight after the onset, the retinal arteries of this eye had as large a calibre as that of the vessels of the other eye. The existence of the heart lesion made it difficult to escape the view that the obstruction was due to embolus in the central artery of the retina. The man was engaged in his electrical work, when a flash took place about 6 feet from him, and two hours later the eye was gradually becoming blind. An hour later the sight came back almost completely. When, however, he went to sleep shortly afterwards he awoke with the eye again blind. The diminished force of the heart's action during sleep probably enabled the blockage of the artery to again become complete. The question of compensation having arisen, he gave the view that there was a causal connexion between the flash and the blindness.

Mr. FOSTER MOORE exhibited a case of Melanoma of the Choroid, which had remained stationary for five and a half years. It showed the characteristic "blue ointment" colour, which was uniformly distributed over the growth. It was only discovered on routine ocular examination. The pigment appeared to be intracellular.

Mr. E. M. EATON contributed an exhaustive paper, illustrated by many slides, on

Visual Perception of Solid Forms.

He showed that the binocular element was the essential factor in stereoscopic vision, but the stereoscopic quality was not an exclusive attribute of binocular vision. It must be recognised that as experience was added sensation came more and more to assume an objective character, and ultimately it became undifferentiable from perception. This was not equally true of any other sense, if indeed it were so at all. In the ordinary view of objects there was no conscious relic of the abstract sense of light; there was merely an impression of the perception of the object seen. It was possible to so suppress the image of each retina that each perception was a composite view made up of part of the image of one eye and part of that of the other. If two retinal images did not fit each other satisfactorily it was possible automatically to cut off the projecting portions. In fact, in only a few circumstances did one utilise the whole of both retinal images. When it was said that by means of binocular vision a view could be obtained around objects, it really meant that spaces behind them could be appreciated, as in looking across a sandy desert in sunshine and perceiving the air agitation due to altering states of atmospheric density, and therefore refracting power.

Mr. J. H. PARSONS spoke of the great value of the paper, especially in connexion with the visual problems of aviation. He said the contribution invited very careful study.

SECTION OF OBSTETRICS AND GYNÆCOLOGY.

A MEETING of this section was held on June 5th, Mr. J. D. MALCOLM, the President, being in the chair.

Exhibition of Cases and Specimens.—Subperitoneal and Retroperitoneal Lipoma.

Mr. T. G. STEVENS showed a specimen of a subperitoneal lipoma weighing 16½ lb., one of two almost similar cases recently under his care. A single woman, aged 35, complained of practically painless abdominal enlargement. On examination a fluctuating tumour was found, with dullness in the flanks, suggesting the presence of free as well as confined fluid, and leading to a diagnosis of ovarian cyst, probably malignant. On operation at St. Mary's Hospital the ascending colon and cæcum were found displaced to the left iliac region, and the tumour was seen to be a lipoma, covered by movable red peritoneum. The tumour was perirenal, and when the kidney had been shelled out was easily enucleated; the colon slipped back into place, and the patient made a good recovery. The second case presented almost parallel features, except that no diagnosis was attempted before laparotomy. The third case quoted by Mr. Stevens had been under the care of his colleague, Mr. A. W. Bourne, at St. Mary's Hospital. The patient had a large tumour, which proved to be inoperable, and was thought to be a malignant ovarian cyst. The woman eventually died as the result of pressure on the diaphragm, and at the post-mortem a perirenal fibro-lipoma, weighing 38 lb., was removed. These tumours, according to Mr. Stevens, are hardly ever diagnosed before operation, as the fat is so thin and liquid at the body temperature as to simulate fluid, either in a cyst or free.

Mr. W. S. A. GRIFFITH showed a retroperitoneal lipoma weighing 13 lb. which either originated in or invaded the right broad ligament. It was successfully removed from a patient, aged 57, who had complained of abdominal pain since the climacteric. Mr. Griffith quoted a case, reported by Treves, of a lipoma of the broad ligament, and commented on the rarity of such tumours.

Mr. GORDON LEY exhibited a case of which the chief interest consisted in sections showing embryonic and striped muscle fibres. The tumour was taken from the vulva of a young child, and was at first thought to be a rhabdomyosarcoma, but subsequent investigation suggested a diagnosis of a non-malignant teratoblastoma.

Submucous Fibroid: Use of Hegar's Dilators.

Dr. H. RUSSELL ANDREWS gave an account of a case in which he dilated the cervix with Hegar's dilators and removed a small submucous fibroid. He noticed that there was a slight tear of the cervix, but thought that it was of no importance. The patient complained of pain in the right thigh and groin afterwards, but there was no bleeding from the uterus and there were no abnormal physical signs until 48 hours later, when a swelling was found in the right iliac fossa. A diagnosis of hæmatoma in the broad ligament was made. While preparations for an exploratory operation were being made, the patient collapsed with symptoms of very severe internal hæmorrhage. A huge retroperitoneal collection of blood, extending up to the kidney, was emptied and a subtotal hysterectomy performed. Seven or eight hours later the patient's condition became so grave that 350 c.cm. of her brother's blood were injected into a vein with excellent immediate results. After a stormy convalescence, complicated by influenza, the patient made a good recovery.

Dr. F. J. MCCANN deprecated the use of large-size Hegar's dilators, and expressed the view that laceration of the cervix was almost inevitable after their use. He advocated the use of a tent, or an incision into the anterior wall of the cervix, the bladder being pushed up as required.—Dr. J. S. FAIRBAIRN held that the rarity of evil consequences justified the use of dilators.—Dr. T. W. EDEN suggested the possibility of some abnormal vascular condition, such as varicose veins, in Dr. Andrews's case, as the retroperitoneal hæmorrhage could hardly have been the result of a tear only.—In reply, Dr. ANDREWS agreed with Dr. McCann as to the danger of large-size dilators, and said that in hospital it was his practice to use tents. He considered the presence of varicose veins might well account for the large hæmorrhage in the case described.

Syphilitic Placentæ.

Dr. EARDLEY HOLLAND gave an account of an examination, during the course of an investigation into the causes of fœtal death, of a series of syphilitic placentæ. He said that the three ways in which a syphilitic placenta might be expected to differ from a normal one were: (1) Naked-eye appearance; (2) ratio of weight of placenta to weight of fœtus; (3) histological changes. Dr. Holland stated emphatically that nothing could be deduced from naked-eye appearance, and showed by carefully compiled statistics that the importance of the weight ratio had been much exaggerated. Out of 34 syphilitic placentæ, 22—that is, 65 per cent. only—were heavier than normal. However, the microscopic examination of the placentæ of 26 fœtuses in whose tissues spirochætes were actually found, presented the following changes, not invariably present, but noticeable as characteristic of syphilis: (*a*) a uniform increase in size of villi, caused by an increase in amount and density of stroma, and implying a corresponding reduction in the size of the intervillous spaces; (*b*) a greatly diminished vascularity of the villi, attributed by the speaker not to an obliterative endarteritis, of which there was no evidence, but to the fact that the vessels had never grown down into the terminal villi; (*c*) in exceptional cases a small round-celled infiltration of the stroma of the villi, suggesting an inflammatory change, and, in five sections, small nodes of leucocytes, either in the thickened chorionic villi or in the decidua, and possibly of a gummatous nature. Dr. Holland pointed out that much caution is necessary in interpreting results, and that a series of control sections is of great assistance, as there is no sharp line distinguishing a pathological change from a physiological abnormality. He divided his placentæ into three classes according to their histology—typical, suspicious, and normal.

Summary as Regards Agreement of Sections with the Diagnosis of Syphilis in 117 Placentæ.

Typical sections in	21	Syphilis present in... ...	19 = 90%
Suspicious ,, ...	16	,, ,, ...	6 = 38%
Normal ,, ...	80	,, ,, ...	4 = 5%

The above table shows well enough that while indefinite indications are of little value, typical sections may be of the utmost diagnostic importance

Reviews and Notices of Books.

Cerebro-spinal Fever: The Etiology, Symptomatology, Diagnosis, and Treatment of Epidemic Cerebro-spinal Meningitis. By C. WORSTER-DROUGHT, B.A., M.B., Captain (Temp.) R.A.M.C., Officer-in-Charge, Cerebro-spinal Fever Ward, and Neurologist to the Royal Herbert Hospital, Woolwich; and ALEX. MILLS KENNEDY, M.D., Captain, late R.A.M.C., late Officer-in-Charge, Cerebro-spinal Fever Laboratory, and Bacteriologist to the Royal Herbert Hospital, Woolwich. With 8 full-page plates and 56 line illustrations and charts. London: A. and C. Black, Ltd. 1919. Pp. 528. 30*s.* net.

THE prevalence of cerebro-spinal fever in this country during the war has greatly increased our knowledge of the disease, as is shown in Dr. Worster-Drought and Dr. Kennedy's recent contribution to this subject. Early in the war books by Sir Thomas Horder and by Dr. Michael G. Foster and Dr. John Gaskell appeared and served a useful purpose in epitomising the known data about the disease, but the time is now ripe for a review of the experience, especially as regards the treatment, thus gained. As so much of the advance in knowledge has been in connexion with laboratory investigation, it is particularly suitable that a skilled pathologist such as Dr. Kennedy, who has been associated for more than three years with Dr. Worster-Drought at the Herbert Military Hospital, should be joint author of this work. Allied authorship is necessarily becoming frequent in medical literature, but in few instances is it more essential than in cerebro-spinal fever, in which successful treatment cannot be achieved without constant laboratory advice. This volume is much more than a critical review of recent work, for it embodies the carefully analysed results of a long series of military cases under the care of the authors, who, while freely quoting the opinions of other workers, express their own conclusions quite definitely. This is well shown in the remarks on the rather difficult subject of relapses, the percentage incidence of which has been very variously estimated by different writers—so much so, indeed, that the "relapses" of some authors are merely the "recrudescences" of others. It is clearly laid down that no recurrence of symptoms should be regarded as a genuine relapse unless the cerebro-spinal fluid at the last lumbar puncture was negative, and all signs and symptoms, including Kernig's sign, have been absent for at least two weeks; adopting this criterion, the authors found that there was only one relapse among 150 cases and 100 convalescents, though elsewhere they record a case with two attacks at 13 months' interval.

In the 20 chapters of this work the whole subject is reviewed with a due sense of proportion both between the pathological and the clinical sides and as regards pre-war and later knowledge. Special interest naturally attaches to the factors responsible for the increased prevalence of the disease since 1914, and the view ascribed to Surgeon-Colonel R. J. Reece that the outbreak in this country in 1914–15 was apparently introduced by the Canadian troops is adopted; this, it may be pointed out, has been sternly combated by Colonel (now Principal) J. G. Adami in his recently published "History of the C.A.M.C.," which, however, was probably not available when the present work passed out of the authors' hands. The chapter on bacteriology shows that the researches of other investigators, especially those of Colonel Mervyn Gordon and his colleagues, under the Medical Research Committee have been utilised to the full. The carrier problem and the mode of invasion by the meningococcus are discussed and have both been personally investigated by the authors, who found that the carrier-rate among 477 recruits under eight weeks' service was 0·63 per cent., as against 2·8 per cent. among 340 men with more than eight weeks' service.

The clinical account is clear and detailed without prolixity and contains some good photographs illustrating rigidity of the neck and Kernig's sign which, though described by this Petrograd physician in 1884, attracted little attention until 1898, when Netter pointed out its supreme significance in the diagnosis of meningitis. The classical form of cerebro-spinal fever of former text-books is the chronic form now relatively uncommon and usually seen only in untreated or imperfectly treated cases. While allowing for confusion

in the past between the results of cerebro-spinal fever and of the meningitic form of acute poliomyelitis, and especially of polioencephalitis, it is shown that, contrary to the popular belief, serious sequelæ are now much less frequent than they were formerly. This is due not only to the relief of intracranial pressure by repeated lumbar puncture, but also to the shortening of the course of the disease by the serum treatment, which is described in the book in a complete and thoroughly practical manner. In summing-up the value of prophylactic vaccines against cerebro-spinal fever, the authors consider that the evidence in its favour is by no means conclusive, and that as most individuals are comparatively insusceptible to the disease, innumerable vaccinations would have to be carried out, and further experimental work done to establish its claim. Probably Gates's paper on the effects of prophylactic vaccination in America, and his demonstration of the presence of immune bodies in the blood of those vaccinated and of chronic carriers, the latter result being opposed to that obtained by the authors, was published after this volume went to press. In conclusion, there can be no hesitation in confidently recommending this work as both a scientific and practical storehouse of information on cerebro-spinal fever.

A Surgeon in Arms. By Captain R. J. MANION, M.C., of the Canadian Army Medical Corps. London: D. Appleton and Co. 1918. Pp. 310. 6*s.* 6*d.*

IT is perhaps unfortunate that the author should, through his choice of title, have associated this book with the profound and inspiring work of Donald Hankey. For there is nothing that is either profound or inspiring to be found in "A Surgeon in Arms." Those who have had any sort of personal contact with the war will not need to be told what is the esoteric meaning of such initials as H.Q., M.O., or O.C., and if there exists anyone in this country who has not had such personal contact, we should not recommend him to seek in these pages a revelation of the drama and pathos of the great battlefield. In this respect Captain Manion's work is in marked contrast to the essays of a French surgeon, Georges Duhamel, collected in "La Vie des Martyrs." Perhaps the most human figure in the pages under review is that of Kelly, the author's batman, "or personal servant," whose name (on p. 31) "tells his nationality," but who by p. 32, and in spite of all his brogue, has become a "proud Anglo-Saxon." We should like to have known Kelly; we feel somehow that there is more in him than appears. But for the most part the story ambles aimlessly on with incident, but without characters, up to the last paragraph: "and all this is in the cause of the great god Mars!" The author seems to sigh—and we sigh with him.

Mental Disorders of War. By JEAN LÉPINE, Clinical Professor of Nervous and Mental Diseases at the University of Lyon. Edited with a preface by CHARLES A. MERCIER, M.D., F.R.C.S., F.R.C.P. London: University of London Press. 1919. Pp. 222. 7*s.* 6*d.*

THIS latest addition to the excellent series of military medical manuals, edited by Sir Alfred Keogh and Sir John Goodwin, has been planned as a text-book for doctors whose ante-war studies and experience have not been particularly concerned with neuro-psychiatry. The exigencies of warfare bring before the army medical officer a whole series of cases, each one of which is a mental study in itself, yet none of which can have, at the outset, that attention given it which it deserves, either because the cases pass rapidly through his hands, or because he is not in a position to come to a conclusion as to their precise nature. It is, nevertheless, a matter of profound practical importance for him to decide who are mentally ill and who are not, and also to avoid gross mistakes in early treatment such as may result in accentuating therapeutic difficulties for those into whose hands the patients may eventually come. Professor Lépine's little manual is calculated to aid the medical officer in his investigation and classification of such cases, and to make him feel more hopeful that he is doing the right thing. From an experience embracing some 6000 cases Professor Lépine describes first the large group of acute mental disorders of warfare, subdividing them into acute mental confusional states and states of depression. There are also useful sections on the concussional, emotional, contusional, and mixed types of shell shock. The second chapter includes chronic mental diseases such as chronic mental confusion, delusional insanity, general paralysis, and various organic dementias. Sections follow on certain nervous diseases with mental symptoms, epilepsy, hysteria, psychasthenia, and traumatic cerebral lesions.

The second part of the book is of peculiar interest, dealing as it does with malingering, with military crimes, and with various types which are as awkward to deal with as they are urgently in need of proper handling—e.g., "those who complain"; "those who accuse themselves"; "those who confess too easily"; "those who seem to be mocking you"; "those who are afraid to come back." A chapter on treatment and disposal generally completes a valuable, well-written, and well-thought-out manual. The machinery of military medicine is such that it is always comparatively easy for the less conscientious medical officer to "pass the case on" and let someone else tackle the question of exact diagnosis, but with this book in his hand we should expect to see even the unexpert face the problems more readily and with greater confidence in himself.

Chronic Traumatic Osteomyelitis: Its Pathology and Treatment. By J. RENFREW WHITE, M.B. (N.Z.), F.R.C.S., Orthopædic Surgeon, New Zealand Forces, &c. With 24 plates and 13 diagrams. London: H. K. Lewis and Co., Ltd. 1919. Pp. 144. 12*s.* 6*d.*

THIS volume opens with a quotation from Leriche, which so admirably states its object, scope, and inspiration that it is worth setting down in extenso—

> "Not enough thought is given to the life which those suffering from osteomyelitis are fated to lead in the future, with continued pain, sinuses constantly reappearing necessitating repeated operations which they must undergo without even knowing how far away is the promised cure or whether amputation will not eventually be necessary. Surely it is worth while to take any trouble that will save this long martyrdom."

The author of the volume sets out with this object in view and essays to deal adequately with the subject of chronic traumatic osteomyelitis. The subject is not new, nor is it very interesting to study, but it is the most important surgical sequel which emerges from the present war. So vital is it that one can strongly urge all those to whose lot it will fall to treat war pensioners—and who will not?—to "read, mark, learn and inwardly digest" Mr. Renfrew White's careful study of the pathology and treatment of osteomyelitis.

The book is short, the subject-matter is well arranged and classified, the plates are good, and the diagrams most useful. The chapters on treatment are particularly valuable in that they insist so dogmatically on the radical treatment required in dealing with sequestra and unhealed tracks through bone. The time is rapidly passing when the surgeon is likely to remain satisfied with the removal of a sequestrum and the timid scraping of the cavity which contained it when only an extensive removal of its wall and its complete obliteration will save the patient from the whole gamut of misery and invalidism with which the presence of sinuses is associated.

The Anatomy of the Peripheral Nerves. By A. MELVILLE PATERSON, M.D., F.R.C.S., Lieutenant-Colonel, R.A.M.C., Professor of Anatomy in the University of Liverpool, &c. London: Henry Frowde, Hodder and Stoughton. 1919. Pp. 166. 12*s.* 6*d.*

THE object of this useful book is to provide a brief account of the peripheral nerves, cranial nerves, and sympathetic system for the use of students and surgeons, particularly for those engaged in military orthopædic work. In it will be found a succinct, accurate, and adequate description of the peripheral nervous system, unencumbered by a mass of detail and presented in an eminently practical form. The diagrams illustrating the book are, on the whole, clear and informative, but one or two have apparently been reduced to such an extent as to render their intricacies a little confusing. We miss, further, a diagram to show the radicular constituent groups in the various peripheral nerves, on the lines of the familiar diagrams by Kocher and more recent ones by Meige of Paris—a matter of much interest and practical importance, as war experience has shown.

FRENCH SUPPLEMENT TO THE LANCET

Under the Editorial Direction of

Professor CHARLES ACHARD, PROFESSOR OF PATHOLOGY AND THERAPEUTICS IN THE UNIVERSITY OF PARIS.

AND

Dr. CHARLES FLANDIN, D.S.O., MÉDECIN-MAJOR DE 2ME CLASSE; CHEF DE CLINIQUE À LA FACULTÉ DE PARIS.

RECENT WORK ON CEREBRO-SPINAL FEVER.

By C. DOPTER,

PROFESSOR, VAL-DE-GRÂCE; MÉDECIN-CHEF TO AN INFANTRY DIVISION.

THE problem of cerebro-spinal fever has become one of capital importance during the war, not on account of the number—a small one—of individuals infected, but by reason of the profound change in conception of its ætiology. This change has effected a revolution in the methods of treatment, and has rendered serotherapy capable of dealing with the new situation with which medical art has been confronted.

Ætiology.

Only a few years before the war cerebro-spinal fever was regarded as a clinical entity as regards its ætiology. It was believed to be due to the meningococcus alone—a coffee-bean coccus, Gram-negative, &c., as described by Weichselbaum. As early as 1912 observation showed that this was not always the case, and that cases of cerebro-spinal fever and sometimes of simple septicæmia occurred in which the causative organism, though resembling the meningococcus, differed from it in certain features, and particularly in those showing specific type. While they yielded cultures similar to those of the meningococcus, and gave identical fermentation of sugars, they might, perhaps, not agglutinate with antimeningococcic serum, and might give negative precipitin and bacteriolysin tests.

In view of these observations such organisms had to be regarded as of a separate species. Although very closely related to the meningococcus, as shown by fixation of complement, they were, nevertheless, distinguished both from the meningococcus by the tests mentioned above and from the pseudomeningococcus, and required a special name. I labelled them *parameningococci*. The ineffectiveness of antimeningococcic serum treatment in the case of patients infected with these organisms gave additional proof of their specific difference. These first conclusions were soon confirmed by various French and other writers.

At this early stage I had already been led to recognise the *plurality* of the meningococci. Further investigations confirmed this opinion, and in June and July, 1914, with M. Pauron, I was able to describe three varieties clearly differentiated by saturation tests of various antibodies (agglutinins, precipitins, bacteriolysins), and labelled α, β, and γ.

The frequency of parameningococcic infections was, however, low as compared with that due to the meningococcus. In cerebro-spinal meningitis the meningococcus was at this period undoubtedly the predominant organism, and was found in 95 to 96 per cent. of the cases; the parameningococci were uncommon.

Types of Meningococci met with during the War.

Investigations had reached this point when the war broke out. The end of 1914 and the year 1915 passed without appreciable change in our knowledge of the disease. In England, however, medical opinion (Rolleston, Bourke, Abraham and Rowland, Ellis, Gaskell and Foster) was impressed by the almost uniform inefficacy of anti meningococcic serum. Detailed bacteriological investigations succeeded in showing that the causative organism was most frequently not the meningococcus but the parameningococcus. In 1915 and the succeeding years somewhat similar results were obtained in the French armies. Gradually the proportion of cases due to parameningococcic infection increased, while that due to meningococcic infection dwindled, so that at the end of 1917 about 50 per cent. of each were recorded.

With some exceptions the researches on this question were limited to certain laboratories, and, putting aside a few divergencies of interpretation, the results entirely confirmed the principle of the plurality of parameningococci first enunciated by me in 1909 (investigations of Martha Wollstein, Elser and Huntoon, Arkwright, Gordon Ellis, &c.). The name alone was changed, and it would seem now that the classification suggested by Nicolle, Debains, and Jouan has been adopted. This is as follows: Meningococcus A, meningococcus type; meningococci B, C, and D, parameningococci. It should be noted that at the moment the meningococci A and B are the most frequent, C is exceptional, and D has only been found very rarely.

Cerebro-spinal fever is, therefore, ætiologically no longer the single disease once supposed. It is clear that there are a number of diseases called epidemic cerebro-spinal fever, associated with identical symptoms and producing exactly similar lesions. It can, however, be stated, as shown by Netter, that the septicæmic forms, although they may occur also in connexion with meningococcus A, seem particularly to be associated with meningococcus B, which, moreover, causes much graver infections and gives a heavier mortality.

Bacteriological Diagnosis.

Nothing in the clinical examination of a case of cerebro-spinal meningitis or of septicæmia justifies the deduction that the causative organism is of the meningococcic group, and still less justifies any attempt at distinguishing between one or other variety of meningococcus. In every case complete and exact bacteriological diagnosis is necessary.

A few years ago, when the meningococcus was the predominant organism in this type of infection, laboratory diagnosis was fairly simple. An organism having been isolated from the pathological fluid under examination, a culture was made for testing further as to (1) sugar reactions; (2) specific agglutination. As regards the latter, the test was carried out in three different tubes containing respectively 1 c.cm. of physiological saline, 1 c.cm. of normal serum diluted to 1 per cent., and 1 c.cm. of antimeningococcic serum diluted to 1 per cent. To each was added an emulsion of the organism under examination. The organism was regarded as a meningococcus if, in addition to appropriate fermentation of sugars, agglutination occurred with the antimeningococcic serum.

At a later date, when the parameningococci were discovered, a tube of antiparameningococcic serum was added to the test. If agglutination was negative with antimeningococcic but positive with antiparameningococcic serum the organism was a parameningococcus, and vice versa.

Frequently, however, positive agglutination occurred with both specific sera. The interpretation then became difficult, and it was necessary to have recourse to an indirect method

to solve the problem. In 1914, in collaboration with M. Pauron, I proposed the use of saturated sera, the saturation sharply distinguishing between specific and group agglutinins. This new technique determined accurately whether the meningococcus or the parameningococcus was present, but it did not indicate the type of the parameningococcus.

A Rapid Agglutination Test.

Recognition of the important bearing of this investigation on treatment caused Nicolle, Debains, and Jouan (1918) to adopt a method which gives a rapid diagnosis, by making use in sequence of monovalent sera for each known variety of meningococcus, as follows:—

Using an 18-24 hour ascitic-agar culture of the organism isolated from the cerebro-spinal fluid, one large loopful (a platinum loop of 2 mm. diameter) is taken and emulsified in 4 c.cm. of physiological saline. The density of this emulsion is equal to that obtained by mixing 1 cg. of the bacteria in 20 c.cm. of saline.

The emulsion is poured into four small agglutination tubes (8 mm. diameter), 1 c.cm. into each tube.

To tube 1 is added 1/20 c.cm. of antimeningococcal A serum.
" " 2 " " 1/20 " " B "
" " 3 " " 1/20 " " C "
" " 4 " " 1/20 " of normal horse serum.

Or 19 drops of bacterial emulsion may be dropped into each tube and one drop of the same volume of the serum. The tubes are then corked with a tight plug of carded cotton and shaken vertically several times to hasten agglutination.

With a positive reaction agglutination can be seen with a hand-lens 5 to 15 minutes from the commencement of the test. A noticeably delayed reaction cannot be taken to indicate with certainty a positive result. If the organism under examination is agglutinated by a specific serum and by normal serum, or by several specific sera, the test must be repeated in higher dilution, at 1 in 50 with each of the four sera.

As meningococcus D is rare, agglutination tests with regard to it can be considered unnecessary. The results thus obtained derive their importance from the need for injecting in each case of cerebro-spinal fever the serum corresponding to the variety of meningococcus isolated. The method gives rapid information as to whether the organism is the meningococcus A, B, or C; in this respect it is unquestionably a step forward.

Nicolle, Debains, and Jouan do not appear to attach importance to sugar reactions in association with their test. Sugar reactions should, however, be of value, for it cannot yet be stated that horse sera, as employed by them, do not contain coagglutinins which might sometimes disturb their results. A record of the sugar fermentations would probably prove to be a control test of considerable value.

Serum Treatment.

Treatment by serum has inevitably reacted to the new views as to the specific ætiology of the disease and as to the creation under the conditions of this war of the races of meningococci known as types B and C.

It must be remembered that these various types, A, B, and C, are affected only by their own specific sera. It was this consideration which before the war had caused me to prepare, in addition to the antimeningococcic serum, an antiparameningococcic serum for use against the parameningococci α, β, and γ described by me. This serum was consequently polyvalent. When used in parameningococcic infections it had given excellent results, as is testified in observations published by various writers before the war and even during its early stages.

The following course of events is therefore usual when dealing with a case of suspected cerebro-spinal fever: Lumbar puncture is performed and a turbid fluid, rich in ill-formed polymorphonuclear leucocytes, is obtained. By centrifugalisation an organism resembling the meningococcus is isolated, and further tests are applied to determine its exact nature. Pending a laboratory report, antimeningococcic serum is given as a measure of precaution. Although repeated on the two succeeding days no improvement results.

The laboratory then reports that the causative organism is not the meningococcus but the parameningococcus. Antiparameningococcic serum is then injected, and the clinical picture changes rapidly; the headache diminishes, the temperature falls, and contractures and stiffness of neck subside. In short, definite improvement occurs and progress is made towards recovery.

This method has justly been criticised for the delay due to the need for awaiting a full identification of the causative organism before utilising the definitely specific serum which would master it. To meet this objection Netter had recourse to a completely polyvalent serum prepared by using all the meningococci and parameningococci as antigens. Such a serum would have been capable of dealing effectively with all cases of meningococcic or parameningococcic infection of whatever type of organism.

I was averse from agreeing to this, for out of 100 cases of cerebro-spinal meningitis 95 or 96 (see above) were due to the true meningococcus; that is, 4 or 5 of meningococcus to 1 of the 3 parameningococci described. Under those circumstances to make a polyvalent serum would have been to deprive a majority of the patients of the benefit of a method recognised as effective, since too much polyvalency might conceivably involve risk of diminished potency. The facts supported me in this, for the earlier attempts with a polyvalent serum on the lines suggested were not satisfactory: the mortality from cerebro-spinal fever rose after the application of the method in the French armies.

Modification of Method of Serum Treatment.

But the specific ætiological conditions were modified during the war, and parameningococci became as frequent as meningococci. An alteration of procedure was necessary, with provision of an antimeningococcic serum based on the changed circumstances; I therefore accepted the fresh point of view.

Nicolle, Debains, and Jouan prepared monovalent sera, anti-A, anti-B, anti-C, and anti-D, to deal with each of the recognised types. But as each of these sera could be used only after the character of the infecting organism had been completely worked out, the patient had to be injected with a polyvalent serum before the conclusion of the bacteriological examination. As experience showed that in the great majority of cases infection was due to types A or B, and that types C and D were very exceptional, a mixture of the anti-A and anti-B sera was used for the first injections.

In practice, therefore, the following is now the procedure in dealing with a cerebro-spinal infection. A mixture of 20 c.cm. of anti-A serum and of 20 c.cm. of anti-B serum is at once injected into the patient. These injections are repeated daily until the nature of the infecting organism has been determined. When this report is available monovalent anti-A, anti-B, or anti-C serum is used, according as the infection is due to the meningococci A, B, or C.

It should be added that Nicolle, Debains, and Jouan now prepare a bivalent (A and B) serum intended for immediate use in place of the mixture of the two monovalent sera A and B to tide over the period prior to completion of bacteriological diagnosis. The results so far obtained with this bivalent serum by Netter seem encouraging.

There is only one criticism to be made, and that relates to the fairly numerous cases in which the laboratory does not succeed in deciding the type of the infecting organism. In that event either the mixture A and B must be continued at the risk of halving the potency of the serum, or one must grope blindly after the monovalent serum which meets the case. This appears to be the weak point of the method.

This defect can be remedied in infections occurring in a definitely epidemic area, though not in sporadic cases. If the epidemic affects one particular population and is produced definitely by type A, it is doubtless better to inject at once serum A, subject to substitution by other monovalent sera, if the bacteriological test, which even in this case must never be omitted, shows that the case is due to other types.

Procedure where Serum Treatment is Unsuccessful.

In spite of adoption of the above rational method of serum treatment based on ætiology as described, failures needing further measures nevertheless do occur.

I need not more than mention those cases where failure is due to too long delayed intervention, to a still too common defective technique in serum treatment, or to bacterial infections secondary to the meningococcus (pneumococci, streptococci, &c.), against which our defences are still poor. I propose rather to dwell on the procedure to adopt when faced with meningococcæmia accompanying cerebro-spinal fever, and to discuss the anatomical and pathological meningeal changes which, by their advent during the course of the disease, prevent serum introduced into the vertebral canal from diffusing to the lesions which it is intended to cure. These changes consist in the formation of meningeal compartments and the development of the meningo-ventriculitis to which so great attention has been directed during this war.

(*a*) *Meningitis with Meningococcæmia.*

The frequent record both of cases of meningococcic septicæmia associated with cerebro-spinal fever and of extrameningeal lesions led naturally to the simultaneous injection of serum into the spinal cavity and into the general circulation. Until recently no deliberate attempt was made at treatment on these lines, partly because Netter had emphasised the view that such cases of septicæmia were cured by spinal injection. Together with Debré he had shown that serum passed rapidly from the subarachnoid space into the circulation.

Such cases may undoubtedly have been observed, and it is maintained that certain cases of meningococcæmia, occurring either alone or in association with meningitis, do recover under these conditions. On the other hand, recent investigations (particularly by Bloch and Hébert) show that this is by no means an invariable result, and that often the septicæmia is not influenced by spinal injection. It is, moreover, very probable, as they maintain, that in addition to its meningeal localisation the organism may remain concealed in various parts of the system, where it is inaccessible to the action of serum introduced intraspinally. From these lairs, where it continues for a while quiescent but alive (choroid plexus, vascular sheaths, &c.), it may from time to time sally forth either to invade the general circulation or to reinfect the meninges. There may thus result either consecutive and irregular waves of septicæmia with their usual clinical features and possibly special effects on certain organs, or else recurrences of meningitis some weeks or even some months after apparent recovery from the initial infection.

What treatment is available for dealing with the meningococci in foci, which, being extrameningeal, thereby escape the action of serum introduced by the spinal route? One can only again advise the use of antimeningococcic serum subcutaneously, intramuscularly, or by the intravenous route.

Bloch and Hébert propose that since cerebro-spinal fever is commonly accompanied by septicæmia its rational treatment implies that in all cases serum should be given "both by the spinal route and by the general circulation." In their opinion this is the only method capable of reaching the extrameningeal nidus of infection and of "preventing the obstinate meningococcic foci which lead to recurrence of meningitis." They regard the choice of route for the introduction of serum as dependent on the urgency of the result required; the intramuscular and still more the intravenous route seem to be indicated in grave infections; subcutaneous injection may with advantage be reserved for cases in which intervention need not be so rapid.

Bloch and Hébert have obtained very encouraging results in a number of serious cases by this method, which deserves further trial. It must, however, always be borne in mind that in intravenous injection every precaution must be taken to avoid anaphylactic shock.

(*b*) *Formation of Meningeal Compartments.*

The autopsy after certain cases of prolonged inflammation reveals a condition which explains why the serum cannot always uniformly bathe all portions of the cerebro-spinal axis.

A study of the anatomy of the subarachnoid spaces shows that this reservoir of cerebro-spinal fluid is traversed by innumerable connective strands dividing it into a network of intercommunicating secondary cavities through which the cerebro-spinal fluid circulates freely.

These communications are unobstructed at the initial stage of meningitis, as is proved by the continuous and free issue of fluid from the lumbar puncture needle. But the condition alters as the disease reaches a chronic stage and the lesions undergo some degree of organisation. Examination of the meninges now shows the presence of fibrous or fibrino-purulent strands intersecting the subarachnoid spaces and lakes to a degree which is only an exaggeration of the normal condition. Closed pockets of varying size often result, sometimes independent of one another; some contain a clear and others a turbid fluid, thus showing that all communication even between adjacent pockets has ceased. The case reported by Boidin and Weissenbach is an example: the cerebro-spinal fluid obtained by lumbar puncture was clear and showed xanthochromia, while that from dorsal puncture was turbid and contained meningococci.

The formation of compartments may occur at various levels in the vertebral canal, and also at the base of the cranium. The latter is a favourite place for the formation of purulent or fibrino-purulent flakes, which become organised and occupy the space between the medulla and the cerebellum, so that complete separation of the spinal from the cerebral meningeal space may result. The serum introduced by the spinal route cannot then reach either the cerebro-subarachnoid spaces or the cavities communicating with them.

When blockage of the arachnoid space has been established injection of serum by routes other than the usual one is indicated; the position of the puncture depending on the site of the obstruction.

(1) *Spinal Blockage.*

When the obstruction occurs in the spinal cavity in such a way as to divide the latter into two portions, lumbar puncture is no longer practicable, and must be replaced by dorsal puncture. Cantas was the first (1912) to attempt this in a case in which he could obtain only 2 c.cm. of cerebro-spinal fluid by puncture at the lumbar site, and in which towards the end of an injection of 20 c.cm. of serum he encountered considerable resistance, followed by a convulsive attack. Several cervical punctures were performed, with subsequent injections of serum by the same route. Cantas attributed the recovery of the patient to the method of treatment.

Subsequently Netter, then Chartier, and finally Ravaut and Kronulitski applied the same method in similar cases. The patient of the last-named responded readily to serum treatment, but difficulty was experienced in withdrawing a sufficient quantity of fluid, and each fresh injection was followed by epileptiform seizures. Ravaut and Kronulitski then attempted high puncture at various levels; only in the cervical region were they able readily to obtain cerebro-spinal fluid.

Boidin and Weissenbach employed this method in a case in which xanthochromia and the difficult egress of cerebro-spinal fluid indicated that obstruction had occurred. L. Girard recently applied this method to a patient who subsequently recovered.

The following is the technique for cervical puncture: The patient lies on his side with rounded spine. The inter-vertebral space between the sixth and the seventh cervical vertebræ is selected, and the needle is directed in the mid-line from below upwards, following the axis of the inter-spinous spaces. In order to avoid injury to the cervical enlargement it is advisable to remove the stylet from the needle, so that the cerebro-spinal fluid can escape directly the point has reached the sub-arachnoid space.

(2) *Basilar Blockage.*

When the obstruction is basilar and completely separates the spinal from the cranial cavity it is logical to introduce the serum directly into the arachnoid spaces of the base. For this purpose sphenoidal puncture and injection may be

applied, in accordance with the suggestion of Bériel and the recent practice of Cazamian.

The technique of sphenoidal puncture is as follows: Introduce a pointed trocar and cannula at a point 2 mm. from the supra-orbital notch; then push the trocar slightly upwards and inwards to reach the bony vault of the orbit; withdraw the pointed trocar and substitute a blunt one; by a little probing the most external portion of the sphenoidal fissure is reached; a fibrous membrane is pierced, yielding a characteristic sense of resistance; the trocar, the inner end of which is in contact with the base, is then withdrawn and cerebro-spinal fluid escapes. A sufficient quantity is removed and serum injected through the cannula left in position.

Cazamian has applied this method in three cases without the slightest difficulty. In two death nevertheless followed (late intervention, made in extremis). The third case, a very grave and almost desperate one, received two injections, one on the right side in the morning, the other on the left in the evening of the same day, and recovered.

Such are the new methods which give a chance of success where blockage prevents the serum from reaching the site of infection. It is probable that in multiple obstruction, such as has more than once been recorded, a single route for puncture will not meet the needs of the case, and it may be necessary to utilise several or all of the routes in the same patient. Cazamian, indeed, is of opinion that in certain cases of multiple obstruction, and especially in bulbo-ponto-cerebellar obstruction, it will sometimes be advisable to inject serum simultaneously by the ventricles and by the sphenoidal route. In such a case the difficulty would be to diagnose the site of the obstructions.

(c) *Meningo-ventriculitis, Blockage of the Ventricles.*

In the normal state the subarachnoid space which envelops the external surface of the spinal cord, cerebellum, and cerebrum communicates freely with the ventricles by the foramina of Magendie at the posterior angle of the fourth ventricle and the foramina of Luschka at its lateral angles. The fourth ventricle in turn communicates with the middle ventricle by the aqueduct of Sylvius and the middle with the lateral ventricles by the foramina of Monro.

In the classic type of cerebro-spinal meningitis the subarachnoid space, which is the sole seat of infection, can be reached by antimeningococcic serum introduced by the spinal route. But the infection may spread to the central cavities, the walls and contents of which may then be involved in the inflammatory changes. An ependymitis or a ventriculitis develops in association with the meningitis, thus giving rise to a meningo-ventriculitis.

In consequence of this extension of infection the foramina of Monro, of Magendie, and of Luschka may be obliterated. The ventricles are then separated from the subarachnoid space, and as a result of this blockage an independent focus of infection develops. It is obvious that under such conditions serum injected by the spinal route cannot come into contact with ventricular lesions, and so can produce no effect on them. Moreover, it is not uncommon at autopsy in such cases to find the spinal meninges healed by the action of the serum, while the ventricles are dilated, inflamed, and filled with a turbid and even purulent fluid.

These new facts are based on indisputable anatomical evidence. The first record of the condition was that of Osler, who in 1899 noted the existence of a dense membrane blocking the lateral ventricles and preventing the issue of cerebro-spinal fluid; the ventricles were enormously dilated and contained a sero-purulent fluid. The obstruction of the various foramina has been well demonstrated by Merle in his remarkable study of acute and chronic ependymitis. Its occurrence explains the impossibility of serum injected by the spinal route reaching the sites at which the meningococcus multiplies far from all bactericidal influence.

Further Evidence of Obstruction of Foramina.

A certain amount of clinical and therapeutic observation supports this view. Its truth is proved by the remarkable records of Harvey Cushing and Sladen, Masson Knox and Sladen, Fischer S. Ravaud, Benedict, Netter, Triboulet, Rolland and Fenestre, Lévy Boucher, Marfan, Cazamian, M. Labbé, Zislin and Cavaillon, F. Ramond, Neveu-Lemaire, Debeyre and Rouvière, Verbizier and Chauvet, Morichau-Beauchant, and others.

Marfan may be quoted in further evidence. He has demonstrated, in addition to the occipital blockage described above, not merely one but several foraminal obstructions at various levels, each helping to form a series of independent foci of infection; the lateral and middle ventricles were separated from the fourth ventricle by blockage of the aqueduct of Sylvius; the fourth ventricle itself was completely isolated on one side by the above blockage, and on the other by obliteration of the foramina of Magendie and of Luschka.

In general the clinical picture in these cases is one of a cerebro-spinal fever improving under the influence of spinal sero-therapy; the symptoms subside for some days and the cerebro-spinal fluid clears, indicating that the patient is on the road to recovery. A relapse, however, follows with symptoms of a ventriculitis resistant to serum treatment. Ventricular puncture then shows the contrast between the appearance of the ventricular fluid—often turbid or even purulent—and the nearly or quite normal condition of the fluid obtained by lumbar puncture. This contrast is clear evidence of ventricular obstruction.

Other evidence as to the occurrence of obstruction is afforded by the injection of coloured liquids into the ventricles. Marfan injected a solution of methylene-blue into a patient's lateral ventricle before autopsy. Lumbar puncture half an hour later showed that the blue solution had not passed into the spinal cavity, while the surface of the brain and of the spinal cord was found at autopsy to be free from any blue tinge.

In another case Marfan and Maillez, using the cadaver, injected 0·5 c.cm. of 2 per cent. methylene-blue into the left ventricle and 0·5 c.cm. of 1 per cent. eosin into the subarachnoid space by the lumbar route. The cadaver was left in a sloping position for two hours. Further punctures gave the following results: fluid from the left ventricle was tinged blue, while that from the right ventricle remained colourless; fluid from lumbar puncture was pink. Communication, therefore, had been interrupted.

Partial Foraminal Blockage.

Here, therefore, is one evident reason for the inefficacy of serum under such circumstances. Another factor may, however, be concerned. In certain cases, according to Ramond, the foramina of Magendie and of Luschka may remain partly, but not completely, permeable, communicating with the subarachnoid space by microscopic fissures. These fissures are, in any case, insufficient to allow of a free flow of cerebro-spinal fluid or of the introduction of serum. When methylene-blue is injected into the spinal route it has difficulty in penetrating into the ventricular cavities; if introduced into the ventricles it shows through the whole course of the disease no tendency to invade the subarachnoid space.

These fissures, although they cannot allow the passage of serum, do not prevent the spread of bacterial infection from the ventricles to the meninges. It is therefore easy to understand that some cases of cerebro-spinal fever cannot recover, because the ventricles, in spite of injections of serum, continue to flood the meninges through the above fissures with their bacterial content unaffected by anti-meningococcal serum. The meningitis continues indefinitely because of an infecting ependymitis.

The following instance recorded by Ramond is particularly significant in this connexion. A patient suffering from cerebro-spinal fever was treated with injections of antimeningococcal serum, which led to the improvement anticipated, with a prospect of recovery. A relapse followed, with reappearance of pus and meningococci in the cerebro-spinal fluid. Certain symptoms appeared which gave rise to suspicion of ventriculitis. From then onwards sero-therapy proved unavailing, and the ventricles continued to instil the specific organisms into the pia mater and thus to rekindle infection in the latter. Each day the infection was conquered by daily spinal injections of serum, but the ventriculitis

continued to develop, as shown by the lesions found at autopsy.

How May this Serious Obstacle to Success be Surmounted?

As the antimeningococcic serum cannot act on the meningococcus and the lesions produced by it except when brought into direct contact with the latter it follows that the serum must be injected directly into the ventricles in the case of ventricular lesions inaccessible to spinal injection. Harvey Cushing and Sladen were the first to attempt this method. They first performed ventricular puncture and then substituted for the fluid withdrawn an equal volume of antimeningococcic serum. The child undergoing this treatment died, but bacteriological examination of the ventricular fluid obtained at autopsy showed a marked diminution in its meningococcus content as compared with that at the first puncture.

This evidence was encouraging and led to similar more or less successful trials, some of which ended in recovery. These caused a number of investigators to adopt the method in a considerable number of cases with results which have been so far somewhat variable. If the proportion of deaths and of recoveries after ventricular puncture is calculated it is impossible not to be struck by the large proportion of the former as compared with the latter. It must not be concluded from this that the method does not yield as satisfactory results as might reasonably be expected. A careful analysis of published cases shows clearly that in nearly all ventricular puncture was performed late in the disease, and that the attack was very severe, even desperate. Clearly it is true that, as with the more recognised method, so with this special form of serum treatment, the earlier the intervention the greater the chance of success.

Moreover, it is clear that, as in the orthodox spinal injection of serum, the question of dose and of its repetition must be considered. Probably one must not be content with a single injection; several consecutive injections must doubtless be made to yield a durable result. It may also be necessary to repeat puncture, not only of one but of both ventricles, for where the foramen of Monro is blocked the normal communication between the two ventricles is stopped and they are isolated from one another, giving rise to a double closed cavity, the lesions in each completely independent of those in the other.

The first attempts were naturally somewhat cautious and groping, without exact rules on which to base an estimate of the moment for intervention. Latterly the results have been more successful; they emphasise the need for establishing a trustworthy procedure to meet the serious situation produced by blockage and isolation of the ventricles. Such a procedure can be based only on the material obtained by systematic clinical observation.

Clinical Picture in Ventricular Lesions.

In general the clinical picture develops as follows. In the first stage spinal injection of serum improves the meningeal symptoms. Even if the patient does not seem cured, he appears much improved, as is frequently shown by the cerebro-spinal fluid reverting to the normal. After four or five days at the normal, the temperature again rises, the headache increases, the patient becomes drowsy, and is intermittently delirious; his reflexes are diminished or abolished; lumbar puncture yields a clear or turbid fluid free from meningococci; sometimes this fluid is tinted yellow, as though the injected serum had not been absorbed; moreover, it does not escape in a continuous stream, but drop by drop; sometimes it is impossible to collect even a few cubic centimetres. Often amaurosis, circumpapillary congestion, and mydriasis may be present. The temperature may remain normal. Finally, in spite of injections of serum the general condition becomes progressively worse: headache is intense, the patient grows emaciated, his muscular system reaches a general condition of contracture and atrophies; incontinence of bladder and of rectum follows, bedsores develop, and death supervenes.

Obviously these extreme limits must not be awaited before attempting interference. What is needed is a decision of the first symptoms which will serve as an indication for the earliest intervention. What system is to be adopted in arriving at a decision?

Points in Diagnosis of Ventricular Lesions.

Investigators lay stress on several signs regarded as cardinal: (1) The rapid recurrence of symptoms after a period of quiescence due to treatment; (2) persistence and even aggravation of symptoms in spite of the use of serum, and notwithstanding the improvement in the naked-eye and microscopic appearance of the cerebro-spinal fluid; (3) xanthochromia of the cerebro-spinal fluid (i.e., non-absorption of serum) and the phenomenon of diminishing pressure; (4) increase in headache and the production of epileptiform attacks immediately after the injection of serum in quantity 2 or 3 c.cm. greater than that of the cerebro-spinal fluid withdrawn (Ramond).

In actual fact not one of these signs appears to be pathognomonic, the more so as each may be found in serous meningitis. It is only their accumulated evidence, added to the general character of the infection, which can justify the suspicion of ventricular lesions producing a change from meningitis to meningo-ventriculitis. In the infant, however, diagnosis is helped by the tension of the bulging and projecting fontanelle.

Diagnosis is more difficult when symptoms of a suppurative cerebral infection accompany from the outset those due to simple meningitis. It then becomes difficult to decide what is due to one and what to the other. In this event no response to serum treatment is to be observed, and spinal injections of serum do not lead to any improvement. The circumstance, however, that the cerebro-spinal fluid returns towards the normal (diminished turbidity and improvement as regards cell and bacterial content) in spite of the initial symptoms persisting, may give a clue; and the appearance of the other signs enumerated above may confirm the diagnosis.

Knowledge of the symptoms justifying ventricular puncture, with its information for the clinician as to the presence of ventriculitis and ventricular obstruction, gives hope of earlier operations by this route and, consequently, of more successful results than those so far obtained.

Whatever special interference may be necessary owing to the resistance of the lesion to antimeningococcic serum, on no account must repeated spinal puncture be omitted, as this is indispensable for the supervision of the cerebro-spinal fluid below the lower limit of obstruction. Ramond's evidence, summarised above, makes such a course imperative as the only one capable of preventing reinfection of the spinal canal from an incomplete ventricular blockage.

Combination of Other Methods with Serum Treatment.

In spite of the judicious use of serum, varied to meet the symptoms, the apparent site of disease, and in particular the blockage of the meninges, recovery may be slow, the patient becoming thin and even emaciated. On the other hand, it may be necessary to suspend the use of serum to avoid the onset of possibly serious conditions resulting from intolerance. Under such circumstances there is need of accessory methods which can be employed, at first in conjunction with serum treatment, but subsequently alone. These methods are: (*a*) "fixation abscess" and (*b*) treatment by vaccines.

(*a*) *"Fixation Abscess."*

The application of this method has been attempted by Boidin and Weissenbach:—

A patient suffering from cerebro-spinal meningitis showed all the phenomena of serous meningitis; serum treatment was continued cautiously, and got the better of the meningococcic infection, which was thought to be under control. At the thirtieth day relapse occurred. Anti-anaphylactic vaccination was given before proceeding with further injections of serum. The first injection was given without incident, but those following were accompanied by such violent reactions that it was necessary to suspend them. Serum treatment was therefore stopped, and the authors produced an abscess by turpentine. In spite of the gravity of the relapse (coma, delirium, brachial monoplegia, facial paralysis, oculo-motor paralysis, root-segment syndrome of the cauda equina) the patient finally recovered without serious sequelæ.

(b) Treatment by Vaccines.

The results obtained by Boidin and Weissenbach are of extreme interest.

A patient recovered readily from an attack of cerebro-spinal meningitis in response to treatment by several intra-spinal injections of serum. On the thirteenth day signs of a serious meningococcic septicæmia appeared. Intravenous injections of serum led to slight anaphylactic symptoms. In order to avoid more serious developments, Boidin and Weissenbach adopted the method of treating with a vaccine prepared from the organism isolated from the blood. They injected 100 millions, then 200 millions, and, finally, 400 millions of organisms. As the patient became emaciated they injected subcutaneously 2 c.cm. of spirits of turpentine. An abscess developed rapidly; this was opened, and the temperature, which for 40 days had oscillated daily between 98·6° F. in the morning and 104° at night, fell markedly on the following morning, and the patient recovered.

Another case was as follows:—

A serious case of cerebro-spinal meningitis received serum treatment; daily injection of 30 to 40 c.cm. of serum, continued for seven days in succession, produced no improvement. Symptoms of blockage (particularly xanthochromia) appeared, but no meningococcæmia. Vaccine treatment was adopted; one injection of bacterial emulsion (the patient's organism) killed by heat at 55° C. for half an hour (350 million bacteria) was followed on the next day by definite improvement. Five days later a second dose (500 millions) caused considerable improvement. Then, four days later, a third injection of 700 million organisms, followed by a fixation abscess produced by injection of 2 c.cm. of spirits of turpentine, produced recovery.

These authors are of opinion that "vaccine treatment and a fixation abscess may be complementary, the former paving the way for the violent action of the fixation abscess." Warencrowe also has published a case in which the use of serum in combination with autogenous vaccine gave good results.

Other Cases of Good Results of Vaccine Treatment.

Recently Florand and N. Fiessinger have reported two cases of cerebro-spinal meningitis which, after having resisted treatment by a monovalent serum, was cured by vaccine.

The first was a case of meningitis due to meningococcus B, complicated by an orchitis and epididymitis due, as shown by puncture, to the same organism. During a relapse intraspinal treatment with serum no longer gave the results anticipated. The first injection of autogenous vaccine gave temporary improvement, the second was followed by recovery without sequelæ.

The second case was that of an American who had developed meningitis due to meningococcus A. Its course was identical with that of the previous case: rapid initial improvement under serum, then a relapse with pyrexia and meningitis; the serum now proved useless, but vaccine was effective. In this case three injections of autogenous vaccine, at intervals of one day, were needed for recovery.

In a third case of cerebro-spinal meningitis which resisted treatment by serums A and B, the cultures from the cerebro-spinal fluid were not positive till the twentieth day, when meningococcus C was isolated. A vaccine (1000 million meningococci per c.cm.) was made from this organism and sterilised by iodine. Two injections at intervals of two days were followed by a drop in the temperature and by complete recovery from the meningeal conditions.

These results are undoubtedly very encouraging and the application of vaccine treatment to cases which do not respond to serum is deserving of further study. This new method will very likely lead to still greater saving of human life.

MENINGOCOCCAL RHEUMATISM AND ARTHRITIS.

BY DR. PAUL SAINTON,
PHYSICIAN TO THE PARIS HOSPITALS.

THE meningeal foci of the meningococcus, dramatic as they are in their symptomatology, must not blind one to the other sites favoured by this diplococcus. The cases of arthritis do not receive recognition commensurate with their importance and frequency among the manifestations of meningococcal infection. Although they are labelled as unusual complications of cerebro-spinal meningitis, they may appear apart from the latter; even during the course of the disease they are often not detected through lack of methodical search.

Meningococcal arthritis may: I., be associated with a cerebro-spinal meningitis; II., be associated with septicæmia apart from meningitis; III., occur apart from other infection.

I. *Arthritis Associated with Cerebro-spinal Meningitis.*

These cases will serve as types for purposes of description. They have long been recognised, and were reported as far back as the first great French epidemic of 1856 by Lefebvre, Lévy, Corbin, and Maillot. Laveran quotes hydrarthrosis and Tourdes articular rheumatism as complicating cerebro-spinal meningitis. During various outbreaks in Paris Teissier, Netter and Deble, Comby, and Sevestre have recorded instances.

During the course of the war the writer, in association with his colleague M. Maillé, has drawn attention to the clinical types of these cases of arthritis. Netter and Durand, and Lafosse have in general confirmed our conclusions.

The frequency with which arthritis occurs during the course of meningitis is variable; Netter and Durand found it in 5·5 per cent. of the cases, while our own observations give a much higher proportion—20 per cent. This difference is, doubtless, due to our method of systematic examination of the joints in all our patients and of aspiration of the joint at the slightest suspicious sign. As will be seen in the course of this article, the articular manifestations are often latent on account of the slight degree of pain which they produce.

Date of Appearance of Articular Complications.

The date of appearance is variable, and may be: (1) pre-meningitic, prior to the meningitis; (2) juxta-meningitic, during the course of the meningitis; (3) post-meningitic—these may be either early or delayed.

(1) *Pre-meningitic arthritis* is fairly frequent; it often affects several joints and is mistaken for acute polyarticular rheumatism. It appears several days before the meningitis in most cases, but may occur long before it; in one case under my care the meningeal infection did not appear till the seventy-fifth day after the onset of articular symptoms. Along with the meningococcic rheumatism there is an intermittent pyrexia which has been closely investigated by Netter and by Brette.

(2) *Juxta-meningitic arthritis* is contemporaneous with the meningitis. The patient is brought in with both articular and meningeal symptoms without any indication as to which is the primary condition.

(3) *Post-meningitic arthritis* is either early or delayed. When early, it appears between the fourth and the seventh day; when late, between the thirteenth and the thirty-fifth day.

From my personal records the following is the onset of articular complications in relation to the meningitis: (1) pre-meningitic arthritis, 1 case; (2) juxta-meningitic arthritis, 2 cases; (3) post-meningitic arthritis, 7 cases; (4) pre- and post-meningitic arthritis (in the same patient), 1 case.

Clinical Types of Meningococcic Arthritis.

Meningococcic arthritis assumes various types. These may be classified as (1) arthralgic type; (2 acute suppurative type (acute meningococcic pyarthrosis); (3) subacute

suppurative type (subacute meningococcic pyarthrosis); (4) hæmarthrosis; (5) plastic type with early ankylosis.

1. *The arthralgic type* is characterised by fleeting articular pain without swelling. It often precedes suppurative forms.

2. *Acute suppurative type (acute meningococcic pyarthrosis).*—This is the most frequent form, occurring in two-thirds of the cases. The articular metastasis is marked by a rise of temperature, accompanied often, but not always, by labial or facial herpes, by difficulty of movement, and by hypersensitiveness of the joint rather than by actual pain.

Suppurative meningococcic arthritis is distinguished by the following clinical features: it is *indolent*, or, at any rate, *only slightly painful;* the patient does not complain of it; even if it is not marked it may not attract the attention of the doctor. It is discovered only by a minute examination of each joint in succession. In one patient with arthritis of the right knee-joint the difference in volume between the right and the left sides was minimal. Yet puncture resulted in the withdrawal of 10 c.cm. of pus. Pain, then, is slight except in exceptional cases.

Arthritis is manifested by *swelling*. When an affected joint is examined, the skin over it is usually normal, sometimes rather warm, often mottled by a rubeolar or papular erythema, which only diligent search may discover. The joint shows little change in outline, the synovial sac is slightly swollen, exploration arouses only slight pain, and at the knee-joint the only sign is a fluid thrill. The swelling increases if left without interference, the synovial sac is outlined under the skin, pain increases, but never becomes more than moderate.

Functional impairment is slight; fairly extensive movement of the joint may be made without serious discomfort, even when the degree of effusion is considerable. To these clinical features of the arthritis must be added its *transient character* and its *mobility*. The affection of the joints migrates abruptly in a succession of outbursts which subside quickly, lasting only 48 hours to 4 or 5 days, so that its mobility is at any rate as great as that of acute articular rheumatism.

In the monarticular form a single joint may be affected by the inflammatory process; in secondary polyarticular meningococcic rheumatism several joints may be affected at the same time. The latter form is very common in children. The knee-joint is the one most often affected. In our series of 17 cases of arthritis the knee was involved in 12; then in order of frequency came the shoulder, elbow, and wrist. The small joints usually escape. In children arthritis of the vertebral column and of the small joints of the fingers has been recorded.

Characters of Purulent Fluid from Joint.

When a joint affected with meningococcic arthritis is aspirated, a liquid with special characters is obtained; it is viscous, uniform, pale grass-green in tint, and almost fluorescent in a way not found in any other form of purulent arthritis. This colouration suggests that the meningococcus growing in the synovia may there find a medium favourable to the development of a chromogenic character.

The cellular content of the fluid is as follows: (1) Very abundant polynuclears, altered and degenerate in type; (2) large serous endothelial cells, rare, vesicular with fragmented nucleus, containing fatty granules; (3) free fat globules. The meningococci occur in abundance, infiltrating the cellular elements in considerable number (sometimes up to 17 to 25 per leucocyte).

The above are the features of the liquid obtained by early puncture; if this is performed at a later stage the purulent character is much more pronounced, the liquid is grumous, containing clumps of fibrin in suspension, sometimes in such abundance that on incision of the joint the pus has the appearance of frog's spawn.

Culture from articular pus on suitable media is consistently positive; this was the case in all our personal instances. Sometimes it happens, as recorded by Netter and Lafosse, that the pus is quite sterile. This is particularly the case where effusion has been very late, and is not surprising in view of the low vitality of the meningococcus in certain environments.

Is any particular variety of meningococcus specially liable to give rise to arthritis? We have no precise knowledge on this point. The several varieties, A, B, or C, if the classification of Nicolle is adopted, or the meningococci or parameningococci, if that of Dopter is selected, appear to us to be equally pathogenic towards the joints.

The course of acute meningococcic pyarthrosis is usually mild; it may end in spontaneous and rapid absorption; joints in which pus had been found appeared to have recovered completely 48 hours later. Articular puncture usually leads to rapid cure.

Other Types of Joint Lesions.

3. *The subacute suppurative type (subacute meningococcic pyarthrosis)* is rare.

In the single case which we demonstrated to the Paris Hospital Medical Society the development had been so slow and so chronic that the diagnosis of tuberculous arthritis of the wrist had been made; the patient then developed meningeal symptoms; at the time of examination our attention was attracted by the slightness of functional disability as contrasted with the swelling of the joint. The patient died as the result of a cerebro-spinal meningitis, and at autopsy purulent effusion into the wrist-joint was found, yielding a pure culture of the meningococcus.

4. *Hæmarthrosis.*—Virchow has recorded the only known case of hæmarthrosis occurring during meningitis; no bacteriological evidence is available. Hæmorrhagic arthritis might be expected in the purpuric forms of meningococcic arthritis; in observations made by M. Netter, and by his pupil Mme. Blanchier, on fresh cases of meningococcic purpura in all cases of arthritis examined the contents of the joint were purulent.

5. *The plastic type with early ankylosis* is not less rare than the type just described.

In the case which came under our notice the onset was acute, and the shoulder-joint was affected at an early stage without intra-articular effusion. Ankylosis was rapid, developing within a few days. A radiographic examination at a later stage showed marked damage to the joint, rarefying osteitis, and subluxation of the humerus. This osteo-arthritis with early ankylosis was followed by a variety of meningococcic infections: broncho-pneumonia, meningitis, arthritis of the knee, and irido-choroiditis with presence of the meningococcus in the blood, so that there was no doubt as to the nature of the articular lesions.

II. *Arthritis Associated with Extra-meningeal Meningococcic Infections.—Meningococcic Rheumatism.*

In a number of cases the first indication of meningococcic infection is to be found in the articular synovial membranes, giving rise to a type of acute generalised articular rheumatism. As a rule, in the acute form the patients have a rigor and a rise of temperature very often accompanied by herpes. The articular localisations are at least as mobile as in rheumatic arthritis, the functional disability is comparatively insignificant, and the pain is less acute than in acute articular rheumatism.

Meningococcic rheumatism may continue for a very considerable time with successive exacerbations, without recognition of its nature; cases have occurred in which it has lasted for weeks without suspicion as to its origin. The exacerbations of the joint symptoms are, however, accompanied by the temperature curve of intermittent pyrexia, arousing suspicion as to their nature.

Meningococcic septicæmia of the intermittent or pseudo-malarial type includes a very large number of cases in which the primary focus was in the joints, as is shown by the observations of Netter and by those in Brette's monograph.

Meningococcic rheumatism rarely occurs alone; it is nearly always accompanied by other phenomena, such as cutaneous erythemata, meningococcic broncho-pneumonia, orchi-epididymitis, and suppurative irido-choroiditis. Pericarditis and endocarditis are rare. The erythema is undetected in some cases; clinically the fact that the polyarticular infection is due to the meningococcus has been betrayed in most cases only by the development of a typical cerebro-spinal meningitis. In a few other cases blood culture, made on account of the unusual course of the symptoms, has revealed the presence of the meningococcus or of

the parameningococcus, whose part in the process had not previously been suspected.

In some cases the meningococcic rheumatism is accompanied by a typhoidal state, sometimes even with characteristic rose-spots.

III. *Primary Arthritis.*

Arthritis occurring as an isolated phenomenon and disappearing rapidly without leaving any trace may be the sole manifestation of a mild meningococcic infection. We have seen only three cases of this type.

In the first two the onset was accompanied by a rubeolar erythema, pains in the lumbar region, and evening rise of temperature to 102·2° F. The case was taken to be one of measles; the appearance of a radio-carpal arthritis, quite exceptional at this stage of the disease, followed soon after by arthritis of the knee, led to exploratory punctures, which in each case yielded a greenish pus, found on culture to contain the meningococcus. Lumbar puncture, performed to ascertain whether there were not a concomitant meningitis, gave negative results.

In the third case an apparently mild arthritis of the knee developed, with a temperature of 103·1°. The absence of functional disability, associated with a fairly pronounced swelling, was the sole characteristic. Puncture of the joint yielded abundance of a green viscous liquid containing polynuclears and intra- and extra-cellular meningococci, identified by culture. The introduction of 5 to 6 c.cm. of antimeningococcic serum into the joint caused a drop in the temperature and cure of the arthritis.

Diagnosis.

When the articular localisations of the meningococcus are superadded to a cerebro-spinal meningitis they are easy to recognise. This is not, however, the case when they are the initial or the only symptom of the invasion of the system by the meningococcus. It is likely that during the course of epidemics of cerebro-spinal meningitis a large number of cases of meningococcic arthritis occur unrecognised.

This is due to their symptomatology being inconspicuous; their characteristics of mobility, indolence, and absence of ankylosis fail to attract attention through their very modesty; they are so sketchy in their outlines that no importance is attached to them and puncture of the joint is not attempted. It is only by this procedure that they can be identified; the microscopic characters of the liquid as detailed above, and particularly its green tint, should arouse suspicion of the nature of the infection; this cannot be verified except by finding the meningococcus in the fluid withdrawn by puncture. In cases where the joint fluid is sterile blood culture on appropriate media may give a clue by showing a meningococcic septicæmia, or even culture from the mucus may give assistance.

In the absence of puncture meningococcic arthritis is diagnosed as rheumatic arthritis, the character of which it simulates. But it is of importance to give the greatest care to a search for certain associated signs suggesting its possible nature. It is exceptional for meningococcic arthritis not to be accompanied by either rubeolar or scarlatiniform erythema. In these cases the neighbourhood of the joint should be examined, as the rash most often occurs here when not generalised. The meningococcus may be sought in the patches of erythema, in which it has in several instances been found by Netter and Salanier. The occurrence of labial herpes may also direct attention towards the possibility of a meningococcic infection.

In the subacute cases, meningococcic arthritis may be mistaken for a tuberculous arthritis. Its clinical character is so different from that of gonorrhœal arthritis that confusion would seem impossible; for while the gonococcus attacks the joint surfaces the meningococcus scarcely affects them.

Pathogenesis.

Meningococcic arthritis is a sign of a more or less evident septicæmia; it must be recognised that side by side with the major infections with the meningococcus are a series of much modified forms which are often undiagnosed.

The meningococcus reaches the joint through the bloodstream. In the majority of cases the stages of infection are as follows: Posterior adenoiditis, blood infection, meningeal infection, then infection of the joints. It may happen that the stages are varied; there may be adenoiditis, blood infection, and then joint infection without involvement of the meninges.

Recognition of the primary articular types is important with reference to the prevention of meningococcic infections; patients affected with this type are not usually isolated in the absence of an exact diagnosis.

Treatment.

Cure is usually spontaneous. It is remarkably assisted by the injection of antimeningococcic serum into the joint after removal of a certain quantity of fluid. On the first or second day after the injection a reaction characterised by pain and swelling is produced, but this is quick to disappear, and the effusion clears up in most cases after a single injection. The individual dose of serum given has never been greater than 10 c.cm. In one case it was necessary to perform arthrotomy; this was followed by rapid recovery, unaccompanied by any stiffness of the joint.

The French Supplement to THE LANCET—under the Editorial Direction of Professor Charles Achard, Professor of Pathology and Therapeutics in the University of Paris; and Dr. Charles Flandin, D.S.O., Médecin-Major de 2me Classe, Chef de Clinique à la Faculté de Paris—has appeared on the dates given in the following list, which sets out the titles and authors of the contributions:—

Sept. 21st, 1918: (1) The Microbic Diversity of the Enteric Fevers, by Professor Achard. (2) Post-Typhoid Atony of the Cæcum, by Maurice Loeper, Professor of the Faculty of Medicine and Physician to the Paris Hospitals.

Oct. 19th, 1918: (1) What the War has Taught Us about Tetanus, by Louis Bazy. (2) Tetanus Consecutive to Superficial Wounds and to Trench Foot: Treatment and Prevention, by Professor Raymond, Médicin Principal de 2me Classe.

Nov. 30th, 1918: (1) General Review of French Cardio-Pathology during the War, by Ch. Laubry, Physician to the Paris Hospitals, Médecin Major de 2me Classe. (2) Methods of Estimating Augmentation in Depth of Volume of Left Ventricle, by Dr. Bordet, Director of the Radiological Laboratory of the Centre of Cardiology of Professor Vaquez, Hôpital St. Antoine.

Jan. 11th, 1919: (1) Gunshot Concussion of the Spinal Cord, by Henri Claude, Professor in the Paris Faculty of Medicine, Physician to the Paris Hospitals; and Jean Lhermitte, formerly Chef de Clinique in the Paris Faculty of Medicine. (2) Contribution to the Study of the Manifestations of Emotional Shock on the Battlefield, by Cl. Vincent, Physician to the Paris Hospitals, formerly Medical Officer to the 46th and 98th R.I. and to the 44th B.C.P.

March 1st, 1919: The Surgical Complications following Exanthematic Typhus, by Dr. Paul Moure and Dr. Etienne Sorrel, Prosectors to the Faculty of Medicine, Paris, Médicins Aide-Majors de 1er Classe, Surgeons to the French Hospital at Jassy.

April 5th, 1919: (1) Nervous Complications of Exanthematic Typhus, by A. Devaux, formerly Interne of the Paris Hospitals, Médecin-Major de 2me Classe. (2) Note on the Epidemic Diseases Observed in Rumania during the Campaign of 1916-17, by Dr. Henri Vuillet, late Interne of the Paris Hospitals.

May 3rd, 1919: (1) Malaria During the War, by G. Paisseau, Médecin-Major de 2me Classe. (2) Distribution of Soldiers, Temporarily Unfit through Malaria, in Agricultural Colonies, by Professor E. Jeanselme. (3) Studies on Renal Function in Chronic Nephritis, thesis by Pasteur Vallery-Radot, reviewed by Professor Charles Achard.

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The Meningococcus: A Recent Chapter.

BEFORE the advent of the war, apart from the so-called posterior basic meningitis of infants, cerebro-spinal fever was unfamiliar in epidemic form in this country. Since the outbreak of 1914–15, however, although at no time has there been any real cause for alarm, cases of cerebro-spinal fever have been considerably more numerous both in Great Britain and France. The opportunities thus afforded for further study of the disease have been made full use of, with the result that a large amount of progress has been made, particularly with regard to ætiology and treatment. In the French Supplement to the present issue of THE LANCET we publish an instructive paper by Dr. C. DOPTER, in which the investigations and views of French observers are ably summarised, as well as a paper by Dr. P. SAINTON, who deals in detail with arthritis due to infection by the meningococcus. It should be well known that upon the original work of Dr. DOPTER is based much of the bacteriological research with regard to cerebro-spinal fever carried out during the war; to him the credit is due for first recognising and establishing the fact that the group of organisms known as "meningococci," the members of which, prior to 1909, were believed to have identical characteristics, was, in reality, composed of several varieties of closely allied diplococci, distinguishable from each other by their serological reactions. All who dealt with the disease in England during 1915 were profoundly disappointed with the results of treatment with the antimeningococcal serum then available. Sir HUMPHRY ROLLESTON'S report[1] to the Medical Director-General of the Navy in that year was typical of this feeling. The majority of observers who sent reports to the Medical Research Committee during 1915 were, in fact, quite unable to decide how much benefit was due to the intrathecal injection of serum and how much to the associated lumbar puncture. Some authors, indeed, went as far as to state that in their opinion the old method of simple lumbar puncture and drainage without serum administration was the better form of treatment. An explanation of the failure soon came to hand in the recognition that the strains of meningococcus responsible for the infection in the majority of cases differed from those used to prepare the antimeningococcal serum employed; in fact, in Dr. DOPTER'S words, "the causative organism was most frequently *not* the meningococcus but the parameningococcus." Early in 1915, however, Colonel M. H. GORDON, in England, had begun his bacteriological investigations, and by means of agglutination and "absorption of agglutinin" tests was able to differentiate three main groups or "types" (termed Types I., II., and III.) among the meningococci responsible for the outbreak of the disease; a Type IV. was added later. The objection has been advanced that the grouping of meningococci by serological methods is purely artificial and depends upon the arbitrary selection of particular strains as standards. Consequently, it is maintained, a classification based upon certain representatives of "types" will not answer if other members of the same type are taken as standard. If, however, the strains selected as standard show the characteristics of one "type" to an almost exclusive degree, then, as pointed out by FILDES and BAKER, in spite of some overlapping, the differences will be sufficiently marked to avoid confusion. The practical value of GORDON'S classification is now admitted beyond doubt as having been of the greatest assistance in dealing with military outbreaks in this country. It is regrettable in the interests of uniformity and for the comparison of results that more than one classification of meningococci should exist, while there appears to be some confusion as to the correlation of the "types" of different observers. Dr. DOPTER regards Dr. NICOLLE'S Type A as corresponding to the original meningococcus, and Types B, C, and D to his parameningococci. With regard to GORDON'S types, it is generally stated that NICOLLE'S Type A includes GORDON'S Types I. and III., while Type B includes GORDON'S Types II. and IV.; in other words Types I. and III. are meningococci, while Types II. and IV. are parameningococci. On the other hand, FLEXNER states that GORDON'S Type I. appears to correspond to Dr. DOPTER'S parameningococcus, Type II. to the ordinary meningococcus, Types III. and IV. appearing to conform to the more common intermediaries. From this it is clear that if a classification based on "types" is to be adopted generally an endeavour should be made to arrive at uniformity.

The method of serum treatment described by Dr. DOPTER—that of injecting equal parts of a mixture of anti-type A serum and anti-type B serum, representing the two most prevalent types, until the exact type of organism responsible for infecting the individual has been determined—is similar to that practised in England at the present time. As in this country, Types I. and II. of meningococcus have been found to be the most prevalent. The antimeningococcal serum prepared at Cambridge for the Medical Research Committee and representing Types I. and II. pooled is given at the first injection and repeated until the responsible organism has been identified. The corresponding univalent serum is then substituted for the pooled serum. Dr. DOPTER advances a criticism which all will appreciate. If the laboratory workers do not succeed in determining the type—as, for example, when the organism, although visible on direct microscopical examination of stained films of the cerebro-spinal fluid, fails to appear in culture—one must continue the administration of the pooled serum at the risk of halving the potency, or grope blindly after the requisite monovalent serum. In recent cases in England, however, the pooled Type I. and II. serum (GORDON) has given excellent results, even though the actual type of infecting meningococcus had not been identified. If no response to the pooled serum occur, the univalent serum corresponding to the prevalent type in that district should be tried. It should also be borne in mind that a naso-pharyngeal swab from the patient may yield the necessary meningococcus, or that there may be several positive contacts from whom one particular "type" is isolated. In cases tending to become chronic, the numerous connective strands normally traversing the subarachnoid space may

[1] THE LANCET, 1915, ii., 909.

become converted into fibrino-purulent bands which form loculi, or may entirely obstruct the spinal subarachnoid canal. In the cranial cavity, obstruction is liable to occur in the region of the foramen magnum and, in association with ventriculitis, at the foramina of Magendie and Luschka. The more recent methods of dealing with these accidents are described by Dr. DOPTER. Cartas's dorsal puncture has been practised in England in some cases with good results, but the sphenoidal puncture of Bériel is little known and cases in which it might be of value are usually submitted to ventricular puncture. The diagnosis between blockage at the foramen magnum and obstruction of the foramina of Magendie and Luschka is no easy matter, as the symptoms of the two conditions are practically identical. A more extensive trial of Bériel's method of sphenoidal puncture in cases showing signs of hydrocephalus should be made; this might lead to more accurate diagnosis between the two forms of obstruction mentioned, and in some cases the necessity for ventricular puncture might be avoided. It is true that ventricular puncture, especially in adults, has not yet yielded encouraging results. As Dr. DOPTER points out, however, the method has usually been resorted to only in desperate cases. Earlier operation should yield better results. In infants the puncture is easily performed through the anterior fontanelle; in adults, if obstruction of the subarachnoid space or ventricular outlet be suspected, dorsal puncture and, if unsuccessful, sphenoidal puncture might first be tried. If these measures are unavailing ventricular puncture remains, and is best performed at Keen's point, 1½ inches above the external auditory meatus, the needle entering the widest part of the lateral ventricle. The examples given by Dr. DOPTER of recovery following "fixation abscess" are of special interest, as the method is little used in England. Many British observers will agree with him that vaccines are of considerable value in obstinate cases. Good results have been obtained in England by using vaccines in combination with the intrathecal administration of serum; in these cases the doses of vaccine were rather larger than those mentioned by Dr. DOPTER, the initial dose being 250 million organisms and the maximum 2500 millions.

In addition to a final solution of these elusive bacteriological problems, there still remains much scope for clinical investigation. Prevention of the chronic stage should be kept in view. By continuing daily lumbar puncture, following the period of serum administrations, until normal cerebro-spinal fluid is obtained, all symptoms being practically absent, some observers claim to have rarely seen their cases become chronic. The importance of early diagnosis and treatment still requires to be more generally recognised. The relation, if any, between the "type" of infecting meningococcus and the clinical features of the resulting disease is worthy of determination. It appears that Type I. (GORDON) gives rise to a severe form of the disease, and one somewhat resistant to treatment; with regard to the other types, reports are conflicting. Those cases, termed by some authors "progressively purulent," and by others "suppurative," in which the cerebro-spinal fluid becomes increasingly thicker and more purulent, furnish a grave problem, as they are still almost uniformly fatal. Arthritis is recognised as an occasional complication of cerebro-spinal fever. One case is reported in the collection of 100 cases analysed from the clinical point of view by the late Professor A. H. CARTER, whose paper will be found on p. 1065 of this issue. Dr. SAINTON suggests in the French Supplement that it would be found more commonly if the joints were examined as a routine; he quotes cases in which the meningococcus has been isolated from joint fluid when no symptoms of cerebro-spinal fever were present and when lumbar puncture gave a negative result. The results do not appear to be serious and the condition clears up rapidly on the administration of a suitable serum. Thus the new chapter in the story of the meningococcus is being written.

Industrial Medical Service.

THE diverse influence exercised upon the health of the adult community by industrial environment is a matter calling for immediate action. The facts are so well known that attention need only be drawn to the much heavier mortality experienced by males in industrial districts than by females; while in country districts the mortality experienced by the two classes is only moderately against the male. The present organisation of public health work makes no attack on this serious state of affairs; concerned as it has been, and is, with such things as water-supply, insanitary dwellings, sewage disposal, and food-supply—all matters of undoubted importance to which the health of the community has reacted—it has not established personal touch with the individual. In this respect preventive medicine has differed from curative medicine, which brings the practitioner into close contact with his patient. The result has been that with regard to preventive medicine the public has cared for none of these things; and advance must be slow until the public does care and appreciates that the health of each individual is not merely a personal matter, but one which acts upon, and reacts to, the health of the community. This will not occur until the profession establishes personal touch on health matters with the individual. Recent developments are, however, tending thitherwards; maternity and child-welfare centres now deal directly with mother and infant, and the school medical officer deals with the individual child. Still, the personal well-being of the adult is left uncared for. How is the profession to establish contact? One way has been pointed out by Dr. H. G. P. CASTELLAIN in a recent letter to the *Times* advocating the employment of trained industrial medical men as full-time or part-time salaried officers in factories. The gathering together of workers in industrial establishments forms groups of persons exposed to similar risks and to similar environment which may be unfavourable. Here their health can be supervised from the moment of engagement throughout industrial life as readily as that of children in a school. Personal contact can be established just where it is most likely to be valued by improving the conditions of labour and easing the toil of daily life; and influence can be directed upon what is recognised to be the darkest spot in the health of the community, and upon the environment that renders it so dark. Dr. CASTELLAIN sets out at some length the multifarious duties which a factory medical officer should undertake, and rightly concludes that there

are but few medical men capable of discharging them. He then puts forward the proposal that a Diploma of Industrial Medicine should be instituted as distinct from a Diploma of Public Health. The field of preventive medicine is certainly wide enough to-day to justify action on these lines, but it is demand which creates supply, and teaching schools are not likely to arrange for courses of instruction unless the demand arises; while on the other hand employers, although gradually beginning to retain medical services, are not likely on their own initiative to recognise that all doctors are not equally qualified for the work, and to engage only those specially trained. The need of industrial medicine for academic position undoubtedly exists, but unless a demand is created on the one side and a supply to meet it on the other it will continue to exist unmet. A policy of delay to see whether some Government department will some day do something does not recommend itself to us. A responsible group of medical men should move in the matter forthwith, and the obvious group is the Association of Certifying Factory Surgeons. This association should take the matter up with the new trades councils on the one hand, point out to them the advantages, economic and social, of industrial medical service, and get them to give preference to trained men; while, on the other, the members should themselves arrange for and attend post-graduate courses and so qualify themselves to meet the demand thus created for industrial medical officers. Once sure in this way of their students the schools would willingly arrange instruction. The association has been calling for years for help from others; here, to-day, is a better way in which they can help themselves and benefit the community.

A Feat of Endurance.

DURING the last week we have seen one of Nature's few remaining records wrested from her, inasmuch as the Atlantic was crossed in a single flight by a heavier-than-air machine with a crew of two super-men. It is just ten years since M. LOUIS BLÉRIOT flew across the Channel in broad daylight on a cloudless day, landing in the grounds of Dover Castle, and eclipsing WILBUR WRIGHT'S previous record flights of 24 miles in October, 1905, and 56 miles in September, 1908. Captain J. ALCOCK and Lieutenant A. W. BROWN, respectively pilot and navigator of a two-engined bombing biplane, flew 1880 miles in 16 hours without a stop at an average speed of 120 miles an hour, for a large part of the time by the light of the moon alone and with scarce a sight of sky or sea at any part of their journey. Something is known of the training of the senses required for the successful flying officer, but it is difficult to see what sense or senses could have played a predominating share in the first successful Atlantic flight. Sight, even when the moon was visible, was practically nullified by the constant cloud and storms of sleet or hail; hearing must gradually have lost in acuteness in the course of 16 hours of continuous exposure to the tremendous din of engines and propeller—it is recorded that both officers were deaf on dismounting; the vestibular sense seems to have been no trusty guide, inasmuch as the pilot admitted involuntary indulgence in stunting and seems to have looped the loop without being aware that his vertical direction was changing. On the other hand, the aviators' horizontal direction must have been marvellously precise throughout, as with no landmarks to guide them their destination was reached without a hitch, when a swerve of a single degree to one or other side of the direct line would have lost them their objective. Presumably the imperfect sense records supplemented each other in nervous systems long trained to rapid and impromptu adjustment. Both officers were of an age at which bodily adjustments are at their maximum intensity—namely, in the neighbourhood of 30 years. The pilot had a previous successful record in military aviation. Both possessed that essential cheerfulness of spirit combined with the intention to stick it out against any odds and to win. The odds were undoubtedly against mere men, and the experience of these super-men in an unparalleled feat of endurance is not likely to have any immediate bearing on the progress of civilian flying. The routine Atlantic air-crossing will probably be of quite another nature. But it would nevertheless be well worth the trouble seriously to investigate the traits, physical and mental, by which the marvellous feat was carried out, and for this reason we welcome the stimulating report (Special Series, No. 28) by Dr. Henry Head, to the Medical Research Committee on the sense of stability and balance in the air.

Annotations.

"Ne quid nimis."

THE ONE-EYED MAN.

THE amount of disability caused by the loss of one eye to a man whose second eye is sound is a subject of which we are likely to hear a good deal in connexion with the matter of pensions. Sir Arthur Pearson, giving evidence before the Select Committee on the Administration of Soldiers' and Sailors' Pensions, characterised the present flat scale, under which the disability allowed for the loss of one eye is 50 per cent., as absolutely absurd, and suggested 25 per cent. as a more reasonable estimate. As he said, a man with one eye is almost as well off as one with two. On the other hand, from the point of view of insurance against any temporary or permanent disability to the remaining eye, the possession of two sound eyes is a matter of considerable importance. Also, the binocular field of vision is considerably larger than the monocular, and may be a factor of importance in the avoidance of accidents—for instance, in crossing a crowded street. With regard to the value of binocular vision, that is a matter on which a great deal of misconception exists. Our knowledge on the subject has not reached any degree of finality, as was shown in a recent discussion on the visual perception of solid forms at the Section of Ophthalmology of the Royal Society of Medicine (see p. 1072). The power of fusing the two dissimilar images of an object which are focussed on the two retinæ is certainly a valuable attainment and helps those who possess it—i.e., the majority of people—to acquire the power of estimating correctly the relative position or distance of objects or parts of objects—a power which is known as sense of perspective, or stereoscopic vision. This power, however, is by no means confined to those with two eyes; the man who grows up blind in one eye from infancy may possess it in almost equal perfection with the possessor of two normal eyes; for the fusion sense

is only one among many factors which contribute to its attainment, and, if it is wanting, may be compensated for by anyone who is able to get full value out of the remaining factors. These are atmospheric and shadow effects, parallax, and, above all, the memory of what the shape of objects really is, according to knowledge which has been acquired in early years, largely by the sense of touch. All these are as available to the one-eyed as to the two-eyed man, and hence it happens that a man may play cricket well or be a good airman, and yet be without the faculty of binocular vision. On the other hand, if one who possesses this faculty is suddenly deprived of it he will be considerably handicapped, especially at first. A woman may find she cannot pour from a tea-pot into a cup without spilling the tea. A hammerman may take some time before he can hit the nail on the head with his former accuracy; indeed, whether or not he can ever attain it again is doubtful. The just assessment of the disability due to the loss of an eye is a matter of considerable difficulty, but certainly Sir Arthur Pearson's estimate is far more reasonable than that of the pensions authority in cases where the second eye is a sound one. Where it is not, the compensation should, of course, be substantially increased.

A STUDY OF EPIDEMIC PNEUMONIA.

A RATHER unfamiliar form of epidemic pneumonia following upon an extensive outbreak of measles among men in the United States army camps is the subject of special study in the latest of the series of monographs published by the Rockefeller Institute for Medical Research.[1] Unlike the monograph recently referred to in THE LANCET of April 26th[2] the present work does not concern itself with treatment, but rather with the pathology of the disease. The epidemic in question appears for the most part to have been one of broncho-pneumonia, with measles as its most important predisposing cause. Later in the outbreak broncho-pneumonia, which itself is due to a secondary infection, arose independently of measles in individual cases and when the agent which caused the secondary infection became virulent enough to give rise to the disease independently it arose in other camps. In the study of the respiratory disease in these camps a consistent plan was followed. In a large number of cases observed clinically swabs from the throat were examined and cultures were made from the sputum, from the circulating blood, and from fluid aspirated from the pleural cavities. The most satisfactory information was derived, however, from the cases in which the bacteriological results could be confirmed and controlled by cultures from the tissues at autopsy. It is interesting to find that repeated cultures made during life and after death sometimes showed the disappearance of one organism and its replacement or overgrowth by another. Analysis of the cases shows that there were two main forms of the infection: that in which the pneumococcus was the chief agent and that in which this part was played by a hæmolytic streptococcus. The influenza bacillus of Pfeiffer was frequently found in the sputum and occasionally in the lungs and pleural fluid; it was always associated with the streptococcus and it has been found difficult to assign it a predominant part in the causation of pneumonia. In general, the pneumococcus, of whatever type, produced lobar pneumonia, but the number of cases seemed not especially different from what ordinarily obtains during this particular part of the year. The streptococcus gave rise to patchy consolidation of which it has been possible to distinguish two types; one of these Dr. MacCallum designates interstitial broncho-pneumonia, while he assigns the name lobular pneumonia to the other one. Practically all the streptococcal cases which lived a sufficient time showed a sero-fibrinous or a fibrino-purulent pleurisy. This sometimes persisted as an empyema after the earlier pulmonary lesions from which it originated had disappeared. The streptococcal infection appears to commence its attack on the upper part of the respiratory tract and the illness commonly is ushered in with a sore throat, fever, and cough. The physical signs in the lungs are often indefinite until evidence of accumulation of fluid in the chest appears. Dyspnœa of the most extreme type, especially during inspiration, is characteristic and results in a livid cyanosis. Many of the patients become hoarse or lose their voices entirely. They are alert, apprehensive, and sleepless. Often there is delirium.

As stated above, the author describes two main types of pulmonary lesions in streptococcal cases. The first of these he designates interstitial broncho-pneumonia and this is essentially the result of infection of the bronchioles with large numbers of streptococci. The *caput cenæ* of the monograph is the detailed description of the morbid anatomy, of which the following is a brief summary.

The interstitial tissues of the lung share to an unusual degree in the inflammatory changes; the lymphatics which run by way of the interlobular septa from the pleura to the glands at the hilum of the lung become thrombosed and it is suggested that bacteria extend by growth along these obstructed channels in both directions and thus passing from the lung to the pleura (in a direction opposed to that of the current in unobstructed lymphatics) infect the walls of the pleural cavity and set up the intense inflammation with outpouring of the fluid exudate already referred to. Examination of the lung also shows firm nodules of consolidation about the terminal portions of the bronchi together with a patchy atelectasis of those parts of lung formerly supplied with air by the obstructed bronchi. Streptococci may be found in tangled masses in the lumen of each affected bronchus or bronchiole mingled with the leucocytes of the exudate, but in most instances they are not found in appreciable numbers within the alveoli or in the pulmonary tissue. Rapid organisation of the inflammatory exudate occurs; the alveolar and bronchial walls, the adventitia of blood-vessels, and the interlobar septa all share in this process.

These changes appear to partake of the nature of a barricading process tending to limit the advance of the streptococci. The infection is fairly well localised to the respiratory tract and there is no septicæmia until, perhaps, the last few hours of life. The second type is essentially a fibrinous, patchy, lobular pneumonia. There are no firm peribronchial nodules. Instead there are patches of consolidation in which alveoli are filled with blood, leucocytes, and in marked contrast to what is seen in the interstitial type with streptococci. There are no interstitial changes and no gross evidences of resistance on the part of the invaded tissues, but widespread necrosis occurs with final destruction of the affected areas of lung substance. In many cases this variety of

[1] The Pathology of the Pneumonia in the United States Army Camps during the Winter of 1917-18. By William G. MacCallum, M.D., New York: Rockefeller Institute for Medical Research. April 16th, 1919.
[2] Recent Advances in the Treatment of Pneumonia, THE LANCET, April 26th, 1919, p. 704.

broncho-pneumonia occurs in the pure form, but in others it is found side by side with the interstitial type. The particular type which the disease assumes in any given case would appear to be determined by the individual resistance to the infection, the lobular form arising where the reaction is feeble.

The author finds that there is nothing new in the forms of pneumonia in this epidemic, and he has cut sections of lungs showing interstitial broncho-pneumonic lesions, similar to those he now describes, obtained from the Army Medical Museum in Washington. The specimens are from cases of pneumonia following an epidemic of measles occurring in the American Army in 1864, and it is especially interesting to note that after 54 years in alcohol the streptococci still stain brilliantly. While the interstitial forms of broncho-pneumonia can be produced by various organisms, including pneumococci, streptococci, and the influenza bacillus, where there is a mixed infection it is difficult to assign to each its exact part in the process. In spite of the frequent presence of the influenza bacillus Dr. MacCallum concludes that the outbreak in the American camps was essentially an epidemic of streptococcal pneumonia.

THE FUTURE OF THE I.M.S.

AT a dinner held last week by members of the Indian Medical Service, his Majesty's Principal Secretary of State for India was the chief guest. The occasion gave opportunity to review the distinguished history of the Service and to comment in diplomatic language upon its present state. Yet the burden of all the speeches and much of the conversation was concerned with the future. Mr. Montague reiterated what he had already promised in February to the representatives of the British Medical Association. There are to be greater facilities for research, new hospitals, new libraries—and something is to be done to make the Service more attractive to the man who must earn his own living. This is the treatment prescribed, and it will be administered if Mr. Montague is successful in bringing about the reforms to which he is pledged. We do not know who is likely to oppose them. New hospitals are vitally necessary to the common weal of India, and unless the Service is made more attractive to newly qualified men it will in the course of a few years cease to exist. India would then be compelled to organise a native ministry of health without the advantages which belong to the present Service with its fine traditions and wide experience. A new organisation might, however, have one advantage: it would almost certainly include women practitioners. As a large proportion of Indian women will not under existing circumstances see a male physician, special scope exists for women to practise medicine in India. The foundations associated with the names of the Countess of Dufferin and Lady Hardinge have helped to create a nucleus. But many more women practitioners are needed. There is no obvious reason why they should not be admitted as candidates for the I.M.S. examination. The Post Office provides a satisfactory precedent for the employment of women in the civil service, and there are many Indian women qualifying year by year in the native colleges whose coöperation might be invited in the administrative medical service of their country.

A broad and generous view of the great health problems which confront the I.M.S. is the thing needful, and the Service has a right to receive adequate support from the whole of the medical profession, whether at home or abroad. India has been fearfully isolated up to now both physically and intellectually. The physical barrier is, fortunately, rapidly breaking down with new and undreamt-of methods of communication. More frequent intercourse on both sides will be the corollary. Doubtless, if the holidays of our colleagues in India came a little more frequently—most of them have been away for more than three years—we should be the gainers as well as they.

INTRAPULMONARY INJECTION OF SERUM IN INFLUENZA.

OWING to the variable results obtained from the use of antipneumococcal serum and the advantage derived from the local application of certain serums, antimeningococcal serum in particular, Mauriac[1] has employed intrapulmonary injection of antipneumococcal serum in cases of influenza with pulmonary complications. Although the treatment was only used in desperate cases, he was much impressed by the rapid improvement shown in the critical fall of temperature. Of 16 cases so treated 13 recovered and 3 died. The injection was made between two ribs right into the lung, the dose given being 20 c.cm. The only symptoms noted during the procedure were paroxysms of coughing in about half the cases, transitory dyspnœa in a few instances, and slight hæmoptysis in another.

A MEDULLARY SYMPTOM-COMPLEX.

IN THE LANCET of June 14th Dr. Sydney A. Owen and Dr. P. A. Leighton describe in considerable detail a case in which the peculiar nature of the symptoms pointed unmistakably to a lesion, probably a hæmorrhage, confined to the distribution of the left posterior inferior cerebellar artery. At the most, some 30 or 40 instances of the condition have been put on record, not, of course, always under the same denomination. The symptom-complex may be only partially developed, or it may occur along with additional symptoms indicative of a lesion beyond the limits of the distribution of the vessel, as in some cases of tumour and of multiple softenings. Where, however, we meet with a pure form of the affection it provides the most perfect instance of complex but minute and exact localisation that is likely to be met with in clinical medicine. The actual transverse section of the lesion in the lateral aspect of the bulb is less than that of a threepenny piece, and its antero-posterior—i.e., vertical—extent is probably less than half an inch, but within these narrow limits so many distinct physiological paths and cell groups are congregated that the clinical manifestations are widespread beyond all proportion to the relative minuteness of the pathological defect. The key to the localisation of the symptom-complex is the crossed anæsthesia—face on one side, arm, trunk, and leg on the other—due to simultaneous implication of spino-thalamic fibres conveying from the opposite limbs and trunk cerebralwards the impulses underlying the appreciation of pain and temperature stimuli, and of the fibres of the descending root of the fifth nerve from the face on the same side. These paths are within a millimetre or two of each other. Other afferent

[1] J. de Méd. de Bordeaux, 1919, xc., 87-91.

tracts are the spino-cerebellars and olivo-cerebellar, which are caught towards the margin of the bulb ventral to the descending trigeminal fasciculus, and disturbance of whose function is revealed in hypotonia and ataxia in homolateral limbs. On the efferent side we need but mention the vestibulo-spinal tract and Deiters's nucleus and connexions, involvement of which results in forced movements, vertigo, titubation, and nystagmus, and the motor nuclei and fibres of the tenth, and perhaps eleventh and twelfth, cranial nerves with characteristic motor defects of innervation in palate, vocal cord, &c., on the same side as the lesion. Finally, the presence of a cervical sympathetic palsy on that side, due to a lesion of the central connexions of the system in the formatio reticularis, is a precious corroborating sign of the anatomical site of the pathological process. Thus notwithstanding the complexity of the clinical phenomena, a little knowledge of nervous anatomy enables the observer to localise within a few millimetres the area involved and to unravel and set in order symptoms as diverse as paralysis of one vocal cord and nystagmus on conjugate deviation, as loss of temperature sense over one half of the body and contralateral ptosis. It should be realised, at the same time, that some at least of the symptoms are "effects at a distance," and that local impairment in a chain of linked neurons will throw out of gear mechanisms whose functional centres are not placed in the particular area of disease. One of the chief points of interest in the syndrome is the occurrence of such visceral symptoms as tachycardia, dyspnœa, and hiccough; examination of vegetative phenomena in lesions above the cord has often been rather summarily conducted, and any case throwing light on their central connexions is worthy of record. We congratulate Dr. Owen and Dr. Leighton on the excellence of their clinical study.

CLINICAL PATHOLOGY EN DETAIL.

THE Memorandum issued by the National Insurance Commissioners, to which we referred in a leading article last week, contains, amongst the many important matters treated, a tentative scheme for the provision of laboratory facilities for the whole population or, alternatively, for the insured part thereof. Two types of laboratories are determined—firstly, those "provided as an essential part of the equipment of clinics and other treatment centres," and also larger research laboratories associated with institutions of university rank. The idea of providing local clinical laboratories is, without question, a sound one and already long overdue. They are still in the air, while the larger wholesale laboratories are for the most part already well established. The omission in the Memorandum of any constructive scheme for the inclusion of the former type of laboratory in the clinics is unfortunate. Presumably, it is intended that what may be called "work en masse," such as the preventive inoculation of institutions and schools against infective disease, Wassermann reactions, work in connexion with cerebro-spinal fever, and investigations into epidemic conditions, should be carried out by the larger type of laboratory. But if this is done the smaller laboratories will be deprived of their best work, and surely the adoption of standard methods in the Wassermann and similar reactions would meet the plea of lack of uniformity in such tests which is at the root of the cry for centralisation. Is it, indeed, always a good thing to have hundreds of such tests a week to carry out? The chances of getting the material mixed up or handed over to inexperienced assistants may well be greater in the large laboratory than in the small, where, perhaps, the average is 20 or so a week. In dealing with the diagnosis of cerebro-spinal fever and dysentery, the nearer the laboratory is to the case the greater is the chance of isolating the typical organism. This is all in favour of the local pathologist, who will not readily reconcile himself to the loss of the interesting work which makes his life worth living, and without which he would drone out his existence in routine examination of urine. Should this come to be the state of affairs, the local laboratories, which might be the aid-posts of the medical profession in the war against disease, will be officered by men of poor spirit or small experience, and so fail in their effect. It might still be well for a representative committee of clinical pathologists to revise the scheme as contained in the Memorandum and to work out the best method of dealing with local laboratories. We might then hope that both kinds of laboratory would have a useful function and at the same time that the local pathologist would be secured against all attempts to filch from him that which makes clinical pathology an attractive career. From the scanty references to his future which are found in the Memorandum we fear that he will experience no sense of such a security.

ANIMAL AILMENTS IN 1918.

THE total number of cattle, sheep, and swine in Great Britain is much below the figure of 1916. If the country is to prosper the next few years must show a great increase in the record of our flocks and herds. It is important, however, that as they are multiplied their parasites shall not multiply with them. The statistical health report of the animal world,[1] which has recently been published, shows a satisfactory decrease in the number of animals suffering from the more serious diseases, with the two notable exceptions of parasitic mange and rabies. There has been a decided fall in the number of cases of anthrax; foot and mouth disease only occurred in three places, all the cases being traceable to a single source. There were but 34 outbreaks of glanders, though this figure does not include cases among the army horses. Sheep-scab and swine-fever also show a marked and welcome decrease. The number of cases of parasitic mange is 8422, as compared with 4689 in 1916. There are many reasons which may account for this, and the problem of getting even with this complaint under present conditions is a difficult one. Some of the factors responsible for the spread of the disease are not far to seek. Stables have been less carefully cleansed than before the war, horse-mastership is now less in evidence, and stable attendants have not been so keen in their work. The proposed 48 hour week for carters and lorry men will not necessarily work an improvement in this respect. Then the new regulations allowing diseased horses to work under supervision, although they have their good side, require careful interpretation, or they may result in a less thorough treatment of the disease itself. The regulations ought to insist on the application of an oily dressing after

[1] Annual Report of the Proceedings under the Diseases of Animals Acts, the Markets and Fairs (Weighing of Cattle) Acts, &c., for the Year 1918, London, His Majesty's Stationery Office.

the animals have been clipped. In civilian stables watery dressings are often half-heartedly applied with the result that they fail to kill the mange mite. The horse goes out when dry and on a windy day the skin debris, hair, and mites fly about and spread the infection. With oily dressings there is less danger of this happening and a better chance of effecting a permanent cure of the animal under treatment. Some stables provide no facilities for the effectual isolation of sick inmates, and this again constitutes a serious factor in the spread of disease. Several pages of the report deal with the epidemic of rabies, which has already received extended notice in our columns.

DIAPHRAGMATIC HERNIA.

ESCAPE of abdominal viscera into the thorax through apertures in the diaphragm is a rare condition, but some seven hundred of such cases have been placed on record. Mr. Richard Warren reports an interesting series in our present issue. It is certain that a proportion of the recorded cases have been congenital in origin, and owe their existence to a partial failure of closure on the part of the septum between the thorax and the abdomen. In this congenital form the diagnosis may be very obscure, and even when the abdomen has been opened the recognition of the exact condition may not be easy. As Mr. Warren points out, one of the signs of diagnostic value, when obstruction is present, is the total absence of abdominal distension. In the traumatic form, when definite history is forthcoming of a severe crushing of the chest, the diagnosis may not be difficult, and the same applies in lesser degree where there has been a severe gunshot wound of the chest or abdomen. Granted the possibility of a diaphragmatic hernia has occurred to the surgeon's mind—and it should do so more frequently than at present—the diagnosis will stand or fall mainly by the presence of a tympanitic note on percussion, with gurgling or tinkling over the lower part of the thorax, the heart being displaced to the right. When it is admissible to delay the most conclusive information will, of course, be afforded by a bismuth meal and subsequent radiography. The only condition which can then fairly be mistaken for a diaphragmatic hernia is "elevation of the diaphragm," first described by Petit. In some cases a definite diagnosis cannot be made until the abdomen is opened. Treatment is clear. Laparotomy alone will make it possible to replace the errant viscera, and, as a rule, it is not difficult to close the opening into the diaphragm by sutures. When operation has not been too long delayed and the patient's condition is not desperate when first seen, operation gives the chance of a favourable result. But, for the present at least, the mortality is likely to remain very high.

CONVOCATION at Oxford decided on Tuesday, by a majority of 6 among 618 voters, to retain Greek as a compulsory subject at Responsions. A proposal to excuse students of mathematics and natural science from the Greek test is likely to be brought forward later in the year as an agreed statute.

INDEX TO "THE LANCET," VOL. I., 1919.

THE Index and Title-page to Vol. I., 1919, to be completed with the issue of June 28th, will be published in THE LANCET early in July. We are glad to be able to restore this pre-war custom, now that it is justified by a more liberal supply of paper.

THE LISTER INSTITUTE OF PREVENTIVE MEDICINE.

The Annual Report.

THE twenty-fifth annual report of the governing body of the Lister Institute of Preventive Medicine—it will probably be known in future as the Lister Institute of Medical Research—is an interesting study of the benefits which organised research work can confer upon a State. Founded some 28 years ago with the objects of studying the best means for the prevention of infective diseases and of providing a focus for research, the Institute has rendered service of a high order to the community, both in times of peace and of war, while its continued activity is of hopeful augury for the future. On the outbreak of hostilities the Lister Institute impressed on the War Office the paramount need of tetanus antitoxin in warfare such as was to be expected under the conditions and surroundings of the European conflict, and on its own initiative took steps immediately to enlarge the capacities of its therapeutic farm at Elstree so as to furnish a supply of this material. It was, in consequence, able to meet the urgent calls for prophylactic serum which began to make themselves heard in 1914. In the bacteriological department, in spite of a depleted staff, the problem of trench fever and its transmission by lice has been investigated, and investigations arising out of outbreaks of food poisoning in the Army in France have been continued, while most valuable work has been done on the anaerobic bacteria which infect wounds. The departments of biochemistry and of experimental pathology have been almost exclusively concerned with the food problem, one aspect of which assumed the highest importance during the war, and is in very many respects vital to the comprehension of the values of foods in the future. The substances known as "accessory food factors," minute quantities of which are indispensable to the assimilation of food in the human organism, are entitled to more honour in their breach than in their observance, for their absence occasions such diseases as beri-beri, pellagra, scurvy, or rickets. Scurvy, for example, which was one of the great problems among troops in Mesopotamia, arose from the absence of an "antiscorbutic food factor" in the ration. The researches of the Institute enabled this fact to be established and suggested the remedy. Causes and remedies similar in kind, though differing in particular, have been investigated for infantile scurvy. Other researches are proceeding in respect of the indispensable food factors in milk, butter, margarine, &c., and these and allied investigations are of the utmost importance when considered with regard to the feeding of the population as a whole, both infantile and adult. Reports upon much of this work of these departments have appeared at intervals in our columns.

The transmission of disease by lice has been the subject of prolonged investigation, and the practical results obtained have greatly increased the effectiveness of our armies and mitigated much suffering. A grant of nearly £600 was made towards the expenses of the War Office committee for the study of tetanus which, under the chairmanship of Sir David Bruce, directed its work during the year mainly to the study of the inter-relations between the various anaerobic bacteria and tetanus. Towards the investigation of trench-fever the Institute contributed a further sum of over £1600, and the committee appointed to deal with this grave source of invalidity has since the last annual report confirmed and supplemented the knowledge previously reached in regard to the spread of the disease by lice. No evidence of any other method of propagation has emerged from this work.

Proposed Research Hospital.

This brief summary of the work done by the Lister Institute will suffice to show the part which it is playing in the investigation and cure of disease. It is proposed to extend this work by adding a research hospital to the Institute, and for this purpose it will be necessary to modify the articles of association. Owing to the increased cost of maintaining laboratories and the enhanced price of labour the work will have to be substantially curtailed unless further financial support is forthcoming. There can be no doubt that the appeal when made will meet with ready response, for the organisation of the Lister Institute stands alone in this country. The Institute has an

unrivalled equipment, both material and personal, for the work which it undertakes, but while its equipment may fairly be put on a level with the Pasteur Institute in Paris or the Rockefeller Institute in the United States, its present inadequate income compares very unfavourably with that of the sister institutions.

THE RESETTLEMENT OF WAR NURSES.

The Nurses' Demobilisation and Resettlement Committee.

THIS committee was formed by the Ministry of Labour, at the request of the Admiralty and the War Office, to aid in the task of demobilising and resettling in civil life the members of the naval and military nursing services. Consisting of representatives of the naval and military authorities and of hospitals and other civilian bodies employing nurses, the committee deals with nurses who are members of the Queen Alexandra's Royal Naval and Imperial Military Nursing Service Reserves, the Territorial Force Nursing Service, the British Red Cross Society, the V.A.D. (including special military probationers who wish to train for the nursing profession), and assistant nurses attached to the three first-named bodies. Thus some 30,000 nurses, trained and untrained, come within its scope, as also do civilian nurses who are being displaced owing to the return to their former posts of nurses up to now engaged in war nursing.

The Report of the Committee.

The last report shows that the London committee has had before it the names of 2966 nurses requiring resettlement; the Scottish subcommittee, 181. Of these, 693 have been released to return to civil employment, 432 have been advised with regard to further training, 722 have been put in touch with employment (exclusive of applications for overseas work), and 174 have been placed. Among the more interesting placings through the committee have been the staffing of a children's hotel, the first of its kind in London; of a Ministry of Pensions hospital at Chepstow—this at 24 hours' notice only; the placing of welfare nurses at the Admiralty and War Office demobilisation offices to deal with relatives inquiring about men; the supply of about 50 nurses to the Overseas Nursing Association and Lady Minto's Indian Nursing Service; and the filling of vacancies notified from Delhi and Tunis.

Resettlement Difficulties.

Many of the women now returning gave up good appointments to undertake war work; these present the chief difficulty. Some of the senior sisters and senior matrons have now nothing to come back to; and, what is more, they have a right to expect better salaries, under the changed conditions of to-day, than they formerly received. It is useless to offer them £30 a year, resident, or £90 non-resident. They have sacrificed much and are entitled to claim some recognition of their services from the employers of nurses. There is obviously, from the character of a great number of the applications received, considerable misunderstanding on the part of the public as to the work for which demobilised nurses are suited. The committee cannot undertake to supply: (1) a sort of upper domestic servant, at a salary of £20 a year, "all found," which some people offer; (2) a children's nurse in a private family; or (3) a probationer in a hospital which is not a recognised training school. With regard to the last class, there are among the demobilised nurses those who need further training—e.g., in maternity nursing—but they should not be asked, in consideration for six months' free training, to sign on for a further period of two and a half years at a low salary. Again, the vacancies notified for district and parish nurses are abundant, but very few army nurses will consent to undertake this work.

The Need for Non-resident Posts.

One of the greatest needs is for non-resident posts. Many of the nurses are tired of institutional life and want more freedom and more personal work than a ward can give. Those who have posts to offer to the following classes of nurses should notify their requirements now:—

1. Nurse assistants to prepare the patient, the instruments, &c. Doctors, dentists, radiographers, surgeons, and specialists giving electrical treatment often require such, but very few have applied to the committee so far. Yet there are among the demobilised very many nurses skilled in orthopædic, ophthalmic, and electrical work.
2. Nurse secretaries.
3. Nurses for private homes or hospitals.
4. Nurse chauffeuses. Among the V.A.D. nurses dealt with by the committee many are qualified for such work.

Personnel of the Committee.

The personnel of the Nurses' Demobilisation and Resettlement Committee is as follows:—

Colonel A. S. Woodwark, A.M.S.
Surgeon Commander A. R. Schofield, R.N.
Mr. J. A. Barlow, Ministry of Labour.
Miss Beadsmore Smith, Principal Matron, Q.A.I.M.N.S.
Dame Sidney Browne, Matron-in-Chief, T.F.N.S.
Dame Sarah Swift, Matron-in-Chief, B.R.C.S.
Mr. G. Q. Roberts, St. Thomas's Hospital.
Miss L. W. Wamsley, Local Government Board.
Miss Mona Wilson, National Health Insurance Commission.
Mr. E. H. Pelham, Board of Education.
Miss Gill, matron, Royal Infirmary, Edinburgh (representing Scottish Subcommittee).
The Matron-in-Chief, Ministry of Pensions.
Lady Ampthill, Joint Women's V.A.D. Dept.
Dr. F. J. H. Coutts, Local Government Board.
Miss Margaret Hogg, Guy's Hospital (for College of Nursing, London).
Miss Amy Hughes, Queen Victoria's Jubilee Institution for Nurses.
Mr. G. H. Brabner, Metropolitan Asylums Board.
Miss Musson, matron, General Hospital, Birmingham (for College of Nursing, Provinces).
Chairman, Miss Durham, Ministry of Labour, Queen Anne's Chambers, London, S.W.1.
Secretary, Miss Shephard, 16, Curzon-street, London, W.1.

Scottish Subcommittee.

Miss J. Melrose, Royal Infirmary, Glasgow (Scottish Matrons' Association).
Miss White (Queen Victoria's Jubilee Institution for Nurses in Scotland).
Miss A. W. Gill, Royal Infirmary, Edinburgh (College of Nursing in Scotland).
Dr. L. D. Cruickshank (Scottish Education Department, Edinburgh).
Lieutenant-Colonel David Wallace, F.R.C.S.E. (Scottish Branch, British Red Cross Society).
Miss M. M. Paterson (National Health Insurance Commission).
Miss Merchant, matron, The Eastern District Hospital, Glasgow (Local Government Board).
Dr. T. F. Dewar (medical inspector, Local Government Board).
Chairman, Miss A. Young, Ministry of Labour.
Secretary, Miss M. Saunders, Ministry of Labour, 112, George-street, Edinburgh.

NEW YORK.

(FROM AN OCCASIONAL CORRESPONDENT.)

Drug Addiction in the United States.

EVIDENCE has already been given showing that drug addiction is unduly prevalent in this country. The Special Narcotic Committee appointed to investigate into the matter has shown that not only is the drug habit in the United States remarkably prevalent, but that this country easily leads the world in the consumption of habit-forming drugs. The committee states that there are 1,000,000 addicts, and that more than $61,000,000 (£12,200,000) is spent annually by these people. The consumption per capita of habit-forming drugs in the United States is nearly ten times more than that of its nearest competitor. According to this report, native, born Americans lead in the consumption of these drugs, and it is stated further that the majority of immigrants put down as addicts did not reach this stage until after they had been in the United States for some considerable time. The traffic in drugs is said to be increasing rapidly. So far as New York city is concerned, the Commissioner of Health reports that there are 103,000 addicts.

Opposition to Compulsory Health Insurance.

The Physicians' Protective League of New York, which met on May 8th, passed resolutions endorsing the action of the Medical Society of the State of New York in instructing its delegates to oppose compulsory health insurance at the annual meeting of the American Medical Association, and

recommended similar action by other medical bodies in this State.

Visit of Foreign Medical Men to America.

A number of European and Canadian medical men have arrived in this country for the meeting of the American Medical Association in the week beginning June 9th. Among the Englishmen now in New York are Sir StClair Thomson, Sir Arbuthnot Lane, and Mr. Hey Groves. Dr. Depage, of Antwerp, has been in America for some little time, and there are present delegates from France, Belgium, Canada, and South America. The New York committee in charge of receiving and entertaining the foreign delegates to the American Medical Association has arranged a series of clinics to be held in the principal hospitals. On Thursday, June 5th, a dinner was given at the Hotel Commodore in honour of the foreign delegates.

Bill to Restrict Vivisection.

has been announced by Senator Myers, of Montana, that he will introduce a Bill into Congress with the object of narrowly restricting the practice of vivisection in the District of Columbia. He states that in his opinion unregulated vivisection means its extensive practice merely to satisfy "wanton and idle" curiosity rather than to serve scientific ends, and expresses the hope that public sentiment will soon demand national legislation to curb its abuses.

June 7th.

The War and After.

THE CASUALTY LIST.

THE names of the following medical officers appear among the casualties announced since our last issue :—

Died.

Capt. G. T. Whyte, R.A.M.C., qualified in Ireland in 1892 and was for some time engaged in West and in South Africa.

Surg.-Cdr. F. Fedorb, R.N., qualified at Glasgow in 1887, and joined the Royal Navy shortly afterwards.

THE HONOURS LIST.

The following awards to medical officers are announced :—

O.B.E.

Surg. Lieut.-Cdr. CHARLES SAMUEL BREWER, R.N.V.R.—For valuable services at the depôt for Mercantile Marine Reserve Ratings at Liverpool.

Surg. Lieut.-Cdr. PAUL G. FILDES, R.N.V.R.—For valuable services on Research Work at the Royal Naval Hospital, Haslar.

Surg. Lieut. JOHN ARNOUX PRENDERGAST, R.N.—For valuable services in H.M.S. *Greenwich*, Depôt Ship of the 14th Destroyer Flotilla.

D.S.O.

Surg. Sub.-Lieut. ANNESLEY GEORGE LENNON BROWN, R.N.V.R.—For the gallantry and devotion to duty displayed by him on the occasion of the torpedoing of H.M.S. *Paxton* by an enemy submarine on May 20th, 1917.

MENTIONED IN DESPATCHES.

The name of Mr. E. S. Crispin, Director of Medical Service, Sudan Government, should have been included in the Sudan list of mentions published in THE LANCET of June 14th.

FOREIGN DECORATIONS.

French.

Croix de Guerre.—Temp. Capt. (acting Maj.) L. Anderson, D.S.O., R.A.M.C.; Lt.-Col. (temp. Col.) W. Bennett, D.S.O., R.A.M.C.; Maj. (acting Lt.-Col.) F. L. Brandish, D.S.O., R.A.M.C.; Capt. R. Burgess, D.S.O., R.A.M.C.; Maj. G. G. Greer, M.C., Canad. A.M.C.; Temp. Capt. (acting Maj.) T. A. Lawder, R.A.M.C.; Col. H. V. Prynne, D.S.O., A.M.S.; Capt. (acting Maj.) P. J. Ryan, M.C., R.A.M.C.; Col. R. P. Wright, C.M.G., D.S.O., Canad. A.M.C.

Médaille d'Honneur des Epidémies, en Argent.—Surg.-Cdr. C. R. Sheward, R.N.; Surg.-Lt. A. Evans, R.N.; Surg.-Lt. R. Wilkins, R.N.

Médaille de l'Assistance Publique, en Argent.—Capt. J. K. Gaunt, R.A.M.C.; Temp. Capt. V. Gray-Maitland, R.A.M.C.; Temp. Capt. A. D. Low, R.A.M.C.; Temp. Capt. W. J. Paramore, R.A.M.C.; Temp. Capt. R. Thomson, R.A.M.C.; Capt. (acting Lt.-Col.) J. H. Ward, D.S.O., M.C., R.A.M.C.

Belgian.

Ordre de la Couronne: Officier.—Maj. (acting Lt.-Col.) T. B. Moriarty, D.S.O., R.A.M.C.

Serbian.

Order of St. Sava, 5th Class.—Capt. F. F. S. Smith, I.M.S.

Cross of Mercy.—Capt. (temp. Lt.-Col.) Sir T. C. English, Bt., K.C.M.G., R.A.M.C.

Hellenic.

Order of George I.: Officer.—Surg. Lt.-Cdr. D. A. Mitchell, R.N.

OBITUARY OF THE WAR.

JAMES MILLAR EVATT, B.A. CAMB., M.R.C.S., L.R.C.P.,

CAPTAIN, ROYAL ARMY MEDICAL CORPS.

Captain J. M. Evatt, who was killed in action in France on March 21st at the age of 28, was the youngest son of the late Dr. Evatt, of Waterbeach, Cambridge. He was educated at the Perse School, Cambridge, at St. Albans School, and at Caius College, Cambridge, graduating B.A. in the year 1912. He finished his medical course at University College Hospital, gaining the gold medal for surgery. In 1913 he qualified M.R.C.S., L.R.C.P., and in the same year filled the posts of house surgeon and assistant in the ear, nose, and throat department of his hospital. In July, 1914, he passed third in the list of successful candidates for the R.A.M.C. He was gazetted Captain in 1915.

URBAN VITAL STATISTICS.

(Week ended June 14th, 1919.)

English and Welsh Towns.—In the 96 English and Welsh towns, with an aggregate civil population estimated at 16,500,000 persons, the annual rate of mortality, which had declined from 13·7 to 10·6 in the six preceding weeks, further fell to 9·9 per 1000. In London, with a population slightly exceeding 4,000,000 persons, the death-rate was 9·6, or 0·8 per 1000 below that recorded in the previous week, while among the remaining towns the rates ranged from 3·8 in Hornsey, 3·9 in Oxford, and 4·0 in Barrow-in-Furness, to 16·3 in Barnsley, 16·5 in Stockton-on-Tees, and 16·6 in Sunderland. The principal epidemic diseases caused 136 deaths, which corresponded to an annual rate of 0·4 per 1000, and included 41 from infantile diarrhœa, 39 from measles, 30 from diphtheria, 12 from whooping-cough, 9 from scarlet fever, and 5 from enteric fever. Measles caused a death-rate of 2·4 in Rotherham and 3·9 in West Bromwich. There were 2 cases of small-pox, 1101 of scarlet fever, and 1093 of diphtheria under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital, against 3, 1093, and 1087 at the end of the previous week. The causes of 32 deaths in the 96 towns were uncertified, of which 8 were registered in Liverpool, 6 in Birmingham, and 3 in Leicester.

Scotch Towns.—In the 16 largest Scotch towns, with an aggregate population estimated at nearly 2,500,000 persons, the annual rate of mortality, which had declined from 13·7 to 12·3 in the four preceding weeks, slightly rose to 12·4 per 1000. The 303 deaths in Glasgow corresponded to an annual rate of 14·1 per 1000, and included 17 from whooping-cough, 9 from measles, 4 from infantile diarrhœa, 3 from diphtheria, and 1 from scarlet fever. The 74 deaths in Edinburgh were equal to a rate of 11·5 per 1000, and included 4 from whooping-cough and 1 from measles.

Irish Towns.—The 104 deaths in Dublin corresponded to an annual rate of 13·4, or 2·1 per 1000 below that recorded in the previous week, and included 1 each from measles and infantile diarrhœa. The 104 deaths in Belfast were equal to a rate of 13·5 per 1000, and included a fatal case of infantile diarrhœa.

THE IRISH MEDICAL ASSOCIATION.—Our Dublin Correspondent writes: The annual meeting of the Irish Medical Association was held last week in Dublin, under the presidency of Dr. G. E. J. Greene, and subsequently of Dr. J. Marshall Day. The annual report stated that on Dec. 31st, 1918, there were 629 members, of whom, however, only 429 had paid their subscriptions for the year. During the year the council had taken legal opinion as to the advisability of converting the Association into a trade-union, and in consequence of the advice received did not think it practicable to form a trade-union. The Association accepted the invitation of the delegates' meeting held the previous week to send representatives to a joint committee for the purpose of discussing the possibility of forming a professional organisation to embrace the whole medical profession of Ireland. A discussion took place as to suitable fees for locum tenens' employment in Poor-law work, and the Association decided that fees varying from 5 guineas to 7 guineas a week should be charged according to the duty performed.

Correspondence.

"Audi alteram partem."

THE COÖRDINATION OF CLINICAL RESEARCH: THE POSITION OF PSYCHIATRY.

To the Editor of THE LANCET.

SIR,—Dr. Chalmers Watson in his article with the above title in your issue of June 7th refers to the drawbacks of specialism, the lack of coördination between clinicians and research workers, the failure to investigate disease of this or that "system" from the standpoint of general medicine. I doubt whether a more glaring instance of these evils could be adduced than that of psychiatry. For some 30 years many of us who are interested in this branch of medicine have been striving for the establishment of a clinic in psychiatry in association with the other clinics of hospitals attached to medical schools. This, after all, is a *chose jugée* outside this country, and it would be presumptuous and unnecessary at this time of day to attempt to explain in a medical journal the crying need which exists for such a clinic. Rather is this a matter for ventilation in the public press, for the enlightenment of public opinion. It was sufficiently humiliating when, in connexion with the last International Congress of Medicine, held in London, the Section of Psychiatry decided to ask Professor Sommer, Director of the Giessen Psychiatric Clinic, to come over and give one of the opening addresses on the aims, working, and achievements of such a clinic. This was done by way of propaganda, it being deemed necessary to put our pride in our pocket. Being firmly of the opinion that there will be no progress in psychiatry until steps are taken to teach, study, and treat in their earlier phases mental disorders in departments of general hospitals, just as in the case of other disorders, I shall hope to see the necessary facilities provided in any such scheme as that outlined by Dr. Chalmers Watson.

Our present position in regard to this matter—and the moment seems opportune to state it—is briefly as follows: The Board of Control (Lunacy Commissioners) in a recent annual report fully recognised the need for such a reform of the Lunacy Laws as would provide for the early treatment of mental disorders, for research and tuition, on the above and associated lines. The recently constituted National Council of Authorities Controlling Institutions for the Care and Treatment of the Mentally Afflicted has strongly urged the reform of the Lunacy Laws, with especial reference to the vital points of early treatment, study, and tuition; so that patients may be received and treated in clinics and in hospitals under local authorities for prolonged periods, and this without legal order, certificates, or other formalities, and without contact with the Poor-law; that the psychoses may be properly investigated and students may be taught (at present I do not admit that they are taught; indeed, they cannot be, as adequate facilities do not exist in this country, possibly with an exception or two). A deputation from this National Council was recently received by the representative of the Home Secretary with reference to this matter, and it was clear that the Home Office was fully aware of the position and in entire sympathy with the aims of the Council. I shall be disappointed if a measure for reform of the Lunacy Laws, with especial reference to revised methods of dealing with early cases of insanity, is not shortly introduced on behalf of the Government, having regard to the views of the Home Office and the Board of Control.

In my judgment it is now advisable that local authorities, in districts in which there is a general hospital with a university and medical school, should seek coöperation with the governing authorities of such hospitals with a view to the establishment of a clinic in psychiatry (to be coördinated with the other clinics) under their joint control as soon as an amended Lunacy Law allows of the treatment of mental disorders (allied nervous disorders would also be dealt with in this clinic) in such. I believe that the Board of Control would accede to an invitation emanating from such university districts, to the effect that one of their members should participate in a joint conference of the authorities named, with a view to giving practical shape to the proposal in question.

The disabilities from which cases of mental disorder at present suffer, as compared with patients in general, the humiliating position of our country in regard to the scientific study of psychiatry—these reasons impel me to take the opportunity afforded by Dr. Chalmers Watson's article to ask your indulgence for space for this letter.

I am, Sir, yours faithfully,

EDWIN GOODALL.

Cardiff City Mental Hospital, Cardiff, June 15th, 1919.

EPIDEMIC PERINEPHRIC SUPPURATION.

To the Editor of THE LANCET.

SIR,—The condition referred to under the above heading in the last two issues of THE LANCET was by no means rare in the base hospitals in France—at least, in the Rouen area. I saw at least 30 (probably more) cases of the condition during 1917 and 1918 at Rouen, Trouville, and Le Tréport. The clinical picture they presented was somewhat different from that described by Mr. Joseph Cunning, doubtless owing to the fact that our patients came under observation at an early stage of the infection—as soon as they became unable to "carry on"—so that we were able to watch the evolution of the disease. In a majority of the cases the illness had begun with prolonged fever—7 to 14 or more days—without any localising pain or symptoms. In several agglutination tests and sputum examinations had been carried out under the impression that they might be cases of typhoid or tubercle. Until the relative frequency of the condition was realised the early diagnosis certainly presented considerable difficulty, but very soon the swinging temperature (quite unlike that of the typhoid group), the pallid and somewhat septic look of the patient, and the presence of a steadily rising leucocytosis, enabled one to make a fairly confident diagnosis often some time before any localising signs were obtainable. Very slight fullness and resistance with deep tenderness in the affected loin were always the earliest local indications. The urine never contained pus. Occasionally slight "febrile" albuminuria was noticed. The onset was always gradual and the patients had always suffered from boils comparatively recently. Bacteriologically I cannot recall a single perinephric abscess which did not yield *Staphylococcus aureus* in pure culture. Every patient eventually made a good recovery after operation.

As regards causation, I think influenza must be ruled out. Numbers of cases were observed many months before influenza made its first appearance, and instances of perinephric suppuration rather diminished than increased in frequency during the epidemic prevalence of influenza. I agree with Sir Thomas Horder that the condition is to be regarded as a staphylococcal pyæmia. It is curious, however, that staphylococcal infection of this type never seems to give rise to staphylococcal septicæmia. Although the perinephric tissue is clearly the site of election, it is not the only one. Major Douglas C. Taylor, M.C., R.A.M.C., has met with two or three cases of large staphylococcal abscess in the pelvis, in one of which a large appendix abscess had been diagnosed. I do not think that our present knowledge of the condition justifies the use of the word "epidemic" in relation to it.—I am, Sir, yours faithfully,

W. PASTEUR,
Late Colonel, A.M.S., Consulting Physician to the Rouen Area, B.E.F.

Chandos-street, Cavendish-square, W., June 14th, 1919.

THE ORIGIN OF LIFE: THE WORK OF THE LATE CHARLTON BASTIAN.

To the Editor of THE LANCET.

SIR,—I have followed the recent correspondence *re* the Origin of Life which was opened in your coloumns by Surgeon-Commander W. Bastian. I feel sure that in asking for a revision of the problem on the lines of investigation carried out so patiently by the late Dr. Charlton Bastian he was in ignorance of the papers of Professor B. Moore, Hon. H. Onslow, and myself. These investigations clearly indicate that in Bastian's experiments there was no evolution of life from inorganic materials. At the same time, I have never felt quite certain of the nature of bodies in one of Dr. Bastian's tubes examined by me and figured in Plate IX., Fig. 6, of my article.[1] I have recently heard that the surface

[1] Annals of Botany, vol. xxx., p. 383, 1916.

sands of the Egyptian deserts, though they must be subject to very high temperatures, are not free from living encysted forms of protozoa, and it seems possible that such encysted protozoa might have escaped destruction by the temperatures used for sterilisation in Dr. Bastian's experiments.

This point can be readily investigated, and I should be glad if some protozoologist would take the matter up and determine the temperatures necessary to sterilise tubes of colloidal silica previously inoculated with definite species of protozoa, the cysts of which can be easily recognised and cultivated. Such an investigation would supplement completely those of Professor Moore and myself as to the origin of the forms described by the late Dr. Charlton Bastian.

I am, Sir, yours faithfully,

SYDNEY G. PAINE.

Imperial College of Science and Technology, London, June 9th, 1919.

HOSPITAL SUNDAY.

To the Editor of THE LANCET.

SIR,—May I solicit your assistance in placing before the public the needs of the London hospitals? I am most desirous that the Hospital Sunday Fund should distribute £100,000 among these institutions this year. Last year's total was over £92,000, and it ought not to be difficult to raise the larger amount in view of the spendid work and reputation of the hospitals during the war. The enormous increase in the cost of everything presses very severely upon the hospitals, and some of them find the greatest difficulty in keeping open.

I will gladly receive contributions from those who are unable to attend their place of worship next Sunday.

Yours faithfully,

HORACE MARSHALL, Lord Mayor,
President and Treasurer.

The Mansion House, London, E.C., June 17th, 1919.

LYSOROPHUS.

To the Editor of THE LANCET.

SIR,—With reference to the annotation in THE LANCET of May 31st, may I suggest that there is another possible derivation of this word from λύω and δροφος, which means thatch or a roof. I do not pretend to suggest what the meaning of the word is, but it must certainly be divided after the third letter as λύω would form λυσι, not λυσο. It might possibly refer to the absence of a carapace in an amphibian. I am, Sir, yours faithfully,

Brighton, June 16th, 1919. E. HOBHOUSE.

MEDICAL MEN AND SHARE HOLDING.

To the Editor of THE LANCET.

SIR,—Many years ago the managing director of a limited company (which I shall not further indicate save that I have seen quite recently its advertisements to the *general public*) sent me a circular inviting me to take shares in the concern. He pointed out to me that I could assist in the growth of the company's business by ordering its products for my patients. Now a limited company belongs to its share holders. In other words, I being in a position which called for the utmost good faith, was to have a money interest in the article which I was to advise my patients to buy! Some years later I went to the Bar and a friend asked me to supply him with materials for revision of the chapter on Secret Commissions in "Bateman's Law of Auctions." This involved reading a number of cases on the subject, and some statutes of recent date. I was surprised to find how far the judges had gone in denouncing every sort of secret profit. "The law will not suffer a man to have an interest conflicting with his duty." It is a maxim of Roman Law that what a servant earns or gains he gains or earns for his master. The references to many cases on the subject are set out in the notes to "Bateman." It is indeed high time that the General Medical Council took judicial notice of the rulings of the judges on these conflicts of interest and duty. The lists of shareholders in limited companies are open to public inspection at Somerset House on payment of 1*s*. I do not know why searches should not be made in the case of notorious offenders. I am, Sir, yours faithfully,

GEORGE JONES.

City of London Hospital for Diseases of the Chest, Victoria Park, E., June 14th, 1919.

THE WORD "PSYCHOLOGY."

To the Editor of THE LANCET.

SIR,—I see in your issue of June 7th that so experienced a writer as the late Dr. Henry Maudsley used the word "psychology" in a sense which is very prevalent to-day, and, I submit, incorrect. His title was "War Psychology, English and German." In the New English Dictionary the definition of psychology is "the science of the nature, functions, and phenomena of the human soul or mind"; and secondarily, "a treatise or system of psychology." Dr. James Ward's "Psychological Principles" might as well bear the title Ward's Psychology. I think the word properly applies only to a scientific study of man's mind, not to the concrete minds of individuals or groups. The letter of "Libra" is on British and German psychology. This evidently does not mean the work of British and German psychologists, but, to use a correct but not pleasing term, the mentality of those two nations, or, to use an older and better one, their mental characters. If we substitute for "Libra's" title "The Zoology of the Fishes of an African Lake" or "The Anthropology of a Kaffir Tribe," we understand at once that the two new terms mean the scientific study of those fishes or those kaffirs, not the individual fishes or men. Of course, the individuals are included in the study. Does not the popular use of the word in question identify the subjects studied by psychologists with their own scientific study? It would appear that there is here a confusion not so much of thought as of speech. If we must adapt ourselves to this transferred meaning, let us do it with a sigh and a mild protest.

I am, Sir, yours faithfully,

WALTER KIDD, M.D., F.R.S.E.

Suffolk-square, Cheltenham, June 10th, 1919.

*** Dr. Maudsley's original article contains no definition of the word: it only insists that in order to "understand truly the psychology of the nations which have plunged headlong into the unprecedented war" one must take into account "the native vigour of each national stock." For William James psychology was "the science of mental life, both of its phenomena and of their conditions," but even if, with Dr. Kidd, we accept the view of the lexicographer rather than that of the psychologist there does not seem to be ground for the suggestion that Dr. Maudsley erred. Dr. Kidd, on the other hand, implies that psychology is synonymous with scientific method. This position is tenable, no doubt, but is it worth holding? A chest problem may be solved by the use of the mind, but the study of such a problem would not, in the ordinary acceptation of the words, be regarded as an exercise in psychology. If it were so regarded no manifestation of human activity associated with consciousness could properly be excluded from the sphere of the psychologist and psychology would be the only science. In practice, consequently, it is more convenient to include under psychology only so much of the method of science as is applicable to the study of mental processes.—ED. L.

A MEATLESS DIETARY IN EPILEPSY.

To the Editor of THE LANCET.

SIR,—The letter of Sir George Savage in THE LANCET of June 14th deserves attention, even from those who possess less than his wide experience and knowledge of mental maladies. As neurologist to a Pensions Board I see a large number of functional and organic cases of epilepsy among the exceptionally large number of detonated neuropathic soldiers. In his Text-book of Medicine Sir William Osler reminded us that the older authors laid great stress upon regimen in epilepsy, going on to emphasise the important point of giving the patient a light diet at fixed hours and avoiding overloading of the stomach. Meat, he added, should not be given more than once a day, and cases occur in which animal food seems injurious. Several years ago the topic came before the notice of the Psychological Association of Great Britain and Ireland, and there was then a strong expression of opinion in favour of a sparing meat diet with less chemical restraint by the bromides. In my experience a large proportion of neurasthenic soldiers are best treated by education and diet, and I suggest that the treatment of epileptics should follow on the same lines, with an occasional blue pill and black draught.—I am, Sir, yours faithfully,

Boscombe, Bournemouth, June 16th. JOHN FREDK. BRISCOE.

Medical News.

ROYAL COLLEGE OF PHYSICIANS OF LONDON.—An extraordinary Comitia was held on June 13th, Sir Norman Moore, the President, occupying the chair.—The President announced the acceptance of the following lectureships: the Goulstonian, by Dr. J. L. Birley; the Horace Dobell, by Sir William Leishman, F.R.S.; the Lumleian, by Sir John Rose Bradford, F.R.S.; and the Croonian for 1921, by Dr. J. L. Golla.—A letter was received from the Right Hon. Christopher Addison concerning the Ministry of Health Act. It contained an invitation to the College to nominate one member of a small panel to assist him in the formation of a Consultative Council. On the motion of Sir F. W. Mott, seconded by Dr. R. Crawford, the President was appointed.—The President then dissolved the Comitia.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.—An ordinary meeting of the Council was held on June 12th, Sir George H. Makins, the President, being in the chair. The congratulations of the Council were given to Sir Anthony Bowlby on being made a Knight Commander of the Most Honourable Order of the Bath and to Sir Charters J. Symonds and Sir D'Arcy Power on being made Knight of the Most Excellent Order of the British Empire.—A report was read from the Board of Examiners in Anatomy and Physiology for the Fellowship stating that at the recent examination 73 candidates were examined, including 20 admitted under the special war conditions, of whom 15 were successful, and 53 admitted under the ordinary conditions, of whom 23 were successful.—A report was read from the Court of Examiners stating that 44 candidates presented themselves for the Final Examination for the Fellowship and of these 15 acquitted themselves satisfactorily. It was resolved that Diplomas of Fellowship should be granted to the successful candidates.—On the recommendation of the Court of Examiners it was resolved that the Universities of Allahabad and Malta should be added to the list of universities whose graduates in medicine and surgery may present themselves for examination for the Fellowship without first becoming Members of the College.—It was resolved on the recommendation of the Board of Examiners in Dental Surgery to revert to the practice of holding three examinations for the Licence in Dental Surgery in the year in view of the large number of students now in the schools, many of whom will be eligible for examination next year. The examinations will be held as follows: First Professional Examination, Oct. 3rd, 1919, and Jan. 29th and April 29th, 1920; Second Professional Examination, Nov. 7th, 1919, and Feb. 27th and May 28th, 1920.—Mr. Jonathan Hutchinson was elected a member of the Board of Examiners in Dental Surgery in the vacancy occasioned by the retirement of Sir Charles Ballance.—The following examiners were appointed for the ensuing year:—

Primary Examination for the Fellowship.—Anatomy: William Wright, Arthur Ralph Thompson, John Ernest Sullivan Frazer, and Gordon Taylor. Physiology: John Beresford Leathes, Herbert Willoughby Lyle, Francis Arthur Bainbridge, and Arthur Rendle Short.

Examining Board in England.—Elementary Biology: Thomas William Shore and James P. Hill. Anatomy: Arthur Thomson, Frederic Wood Jones, and Frederick Gymer Parsons. Physiology: George Alfred Buckmaster and Herbert Elliot Roaf. Midwifery: John Shields Fairbairn, George Frederick Darwall Smith, Cuthbert Lockyer, and George Drummond Robinson. Diploma in Public Health: Part I., John William Henry Eyre; Part II., Frederick Norton Kaye Menzies. Diploma in Tropical Medicine and Hygiene: Bacteriology, John William Henry Eyre; Diseases and Hygiene of Tropics, Charles Wilberforce Daniels.

The following lecturers and professors were elected for the ensuing year:—

Hunterian Professors: A. Keith, Sir Berkeley Moynihan, W. G. Spencer, James Sherren, H. T. Gray, R. Farrant, and V. Z. Cope. Arris and Gale Lecturers: F. Wood Jones and G. Elliot Smith. Arnott Demonstrator: A. Keith. Thomas Vicary Lecturer: Sir John Tweedy.

The President was appointed to represent the College at the inaugural meeting of the annual conference of the Royal Institute of Public Health.—A letter was received from Mr. H. J. Waring reporting the proceedings of the General Medical Council at their recent session. The best thanks were given to Mr. Waring for his services as the representative of the College on the General Medical Council.—On the motion of Mr. Waring it was resolved to appoint a committee to consider and report upon the future position of the College in its relation to medical education and examinations.

As the result of the recent Final Examination for the Fellowship, for which 44 candidates presented themselves, diplomas of Fellow were conferred upon the following 15 candidates (including one woman):—

John Bruce Baird, Glasgow Univ. and St. Bart.'s Hosp.; Martin Wright Kliman Bird, St. Bart.'s Hosp.; Henry Harold Greenwood, Leeds Univ.; Thomas Albert Hindmarsh, Durham Univ.; Thomas Ernest Victor Hurley, Melbourne Univ.; Theodore Hartman Just, Cambridge Univ. and St. Bart.'s Hosp.; Emily Catherine Lewis, Royal Free and Charing Cross Hosps.; Arthur Eisdell Moore, Edinburgh Univ.; Hickman Walter Lancelot Molesworth, London Hosp.; Hibbert Alan Stephen Newton, Melbourne Univ.; Leonard George Phillips, Middlesex Hosp.; Harold Bedford George Russell, Cambridge Univ. and St. Bart.'s Hosp.; Robert Evelyn Tissington Tatlow, Trin. Coll., Dublin, and Leeds General Infirmary; William George Dismore Upjohn, Melbourne Univ.; and Ronald Ogier Ward, Oxford Univ. and St. Bart.'s Hosp.

Diplomas of M.R.C.S., L.R.C.P. were conferred upon the following two candidates, who have passed the requisite examinations and have complied with the by-laws:—

Simon Kelly, Manchester Univ.; and Charles Albert Lang, Toronto Univ. and Univ. Coll. Hosp.

The Licence in Dental Surgery was also conferred upon Horace Oliver Irwin, Guy's Hospital, who has now complied with the necessary by-laws.

UNIVERSITY OF GLASGOW.—The following were on June 12th appointed University lecturers in connexion with the Faculty of Medicine:—Tuberculosis (at the Ruchill Hospital): Dr. Alexander S. M. Macgregor. Medical Diseases of Infancy and Childhood (Royal Hospital for Sick Children): Dr. Leonard Findlay. Surgery and Orthopædics in Relation to Infancy and Childhood (Royal Hospital for Sick Children): Dr. Alexander MacLennan.

LONDON HOSPITAL MEDICAL COLLEGE.—A course of clinical lectures for advanced students on "Intermittent Blood Infections and their Relation to Certain Common Diseases of the Kidney, Prostate, Testicle, and other Organs," will be delivered by Mr. Frank Kidd in the clinical theatre of the hospital on four successive Wednesdays, beginning August 6th. Members of the medical profession will be admitted on presentation of their cards.

THE WORK OF THE SCOTTISH WOMEN'S HOSPITALS.—The work, although greatly reduced, is continuing in Serbia, where hospitals are being maintained at Belgrade and at Vranja in Old Serbia. The latter hospital is the only medical centre in the district. The Headquarters Committee (2, St. Andrew-square, Edinburgh) is represented in London by an office at 110, Victoria-street, S.W.1.

NATIONAL COUNCIL FOR COMBATING VENEREAL DISEASES.—The annual general meeting of the National Council will be held on Monday, June 23rd, at the Fellows' Room, Royal Botanical Gardens, Regent's Park, London, N.W., at 3.45 P.M. Lord Sydenham will occupy the chair and Dr. Addison will speak.

THE CHAIRMANSHIP OF THE IRISH PUBLIC HEALTH COUNCIL.—It is announced that Dr. E. Coey Bigger has been offered the chairmanship of the Irish Public Health Council which is to be set up by the Chief Secretary in obedience to the Ministry of Health Act. Dr. Bigger was for many years a medical inspector of the Local Government Board, and for the past four or five years he has been the medical member of that Board. He is also chairman of the Central Midwives' Board (Ireland) and a member of the General Council of Medical Education and Registration. He was a member of the Vice-Regal Committee on Poor-law Reform which reported in 1906. It is understood that acceptance of the chairmanship of the Health Council will entail the retirement of Dr. Bigger from the Local Government Board.

NATIONAL CONFERENCE ON INFANT WELFARE.—The conference on infant welfare arranged by the National League for Health, Maternity and Child Welfare is to be held in the Kingsway Hall, London, W.C., from Tuesday, July 1st, to Thursday, July 3rd. On Tuesday the inaugural address will be given by Dr. Addison. The morning session will be devoted to a discussion on ante-natal and neo-natal mortality and its prevention, when papers will be read by Dr. Amand Routh, Dr. Eardley Holland, and Dr. Morna Rawlins. At the afternoon session, Sir Malcolm Morris in the chair, Dr. C. W. Saleeby will read a paper on the racial poisons and the racial prospect, followed by Dr. J. J. Buchan. On Wednesday morning, Sir Francis Champneys in the chair, the work of the midwife in relation to ante-natal and neo-natal mortality will be discussed by Dr. S. J. Fairbairn, Miss Burnside, and others. In the afternoon (chairman, Mrs. Scharlieb) the industrial employment of mothers in relation to infant mortality will receive consideration from Dr. Rhoda Adamson, Miss Barker (Woolwich), and Mrs. Holden (Dewsbury). On Thursday the subject for discussion is the illegitimate child, the Council for the Unmarried Mother coöperating in the conference. At the morning session Sir John Kirk is in the chair, when Lady Nott-Bower will deal with the destitute unmarried mother, and Mr. Robert Parr with the legislative aspect of the illegitimate child. In the afternoon (chairman, Mrs. H. A. L. Fisher) Mrs. A. C. Gotto, Dr. W. F. J. Whitley, and Miss Cox (Salvation Army) will deal with other aspects. Tickets for the whole conference, price £1 1s., may be obtained from the secretary, N.A.P.I.M., at 4, Tavistock-square, London, W.C.1.

PRESENTATION TO SIR W. WHITLA, M.P.—At the annual dinner of the Ulster Medical Society, held on June 12th, the opportunity was taken to present Sir W. Whitla with a silver cup, given by his colleagues of the medical staff of the Royal Victoria Hospital, Belfast, on his recent retirement under the 65 years age-rule from that institution.

Dr. C. S. Myers, F.R.S., director of the Cambridge University laboratory of experimental psychology, has been elected a Fellow of Caius College.

LAY PREACHERS ON HOSPITAL SUNDAY.—With the approval of the Bishop of London, Sir James Cantlie will preach on Sunday next, at 6.30 P.M., at St. Peter's Church, Vere-street, London, W.

THE Banca Commerciale Italiana has sent to the Italian Hospital, Queen-square, a gift of £1000 for the endowment of one of the Allied war beds, commemorating the wounded treated in the hospital.

Colonel A. Fullerton has been elected President of the Ulster Medical Society for the session 1919-20; and Dr. J. T. Creery (Coleraine) has been appointed President of the Ulster Branch of the British Medical Association for the coming year.

A NEW NURSING HOSTEL FOR CAMBRIDGE.—Mr. C. Morland Agnew, M.A., of Trinity College, Cambridge, has given £25,000 for the purchase of a site and for the building and equipment of a new nursing hostel in Cambridge as a token of gratitude for the recovery of Mrs. Agnew after an operation at the present nursing hostel. The Cambridge College will be asked to contribute towards a guarantee fund of not less than £750 for the first 12 months' expenses of conducting the hostel on the new site.

LITERARY INTELLIGENCE.—Messrs. Cassell and Co., Ltd., announce the forthcoming appearance of the first two numbers of a new "English Public Health Series," edited by Sir Malcolm Morris—namely, an introductory volume entitled "The Story of the English Public Health," by the editor, and "Infant and Young Child Welfare," by Dr. Harold Scurfield, medical officer of health for Sheffield.—The University of London Press, Ltd., announce for immediate publication a second edition of Dr. H. R. Cole's "Mental Diseases," revised throughout and reset.

THE "ROASE SIDGWICK" FELLOWSHIP.—As a memorial to Miss Sidgwick, one of the two women members of the British Educational Mission which visited the United States last year, where Miss Sidgwich died of pneumonia, American university women have founded a Fellowship for graduate study in arts. It will be awarded annually to a British woman for a year of graduate research work at an American college or university. The fellowship has been subscribed for by every college and university visited by Miss Sidgwick, and during 1919-20 it will be tenable at Columbia University, New York. Applicants should apply before July 1st. Full particulars may be obtained from Miss L. C. Kempson, Bedford College for Women, London, N.W.1.

EAST SUSSEX HOSPITAL.—It was stated at the seventy-ninth annual meeting of the East Sussex Hospital at Hastings, held on June 10th, that it had been decided to proceed with the erection of the new hospital so far as the administrative (central) block was concerned, and allow secondhand huts to serve the purposes of laundries, &c., until a future time. It was felt that with the great increase in prices the sum originally estimated would not in any way allow the full scheme to be carried out at present. The year 1918-19 constituted a record for the hospital, with no fewer than 962 in-patients, and the increase being due to the admission of 222 sick and wounded soldiers. Out-patients numbered 3898, with 31,250 attendances.

THE LATE SIR BARCLAY JOSIAH BARON.—Sir Barclay J. Baron, M.B., C.M. Edin., J.P., died at his residence at Clifton, Bristol, on June 7th, from complications following the fracture of a rib, caused by a fall in his garden. The deceased was for many years on the honorary medical staff of the Bristol General Hospital, and was in charge of the nose and throat department of that institution for about 18 years, enjoying a considerable consulting practice in Bristol and district. Since 1915 he took an active part in the municipal life of Bristol, being elected for the Clifton ward. He was for two years Lord Mayor of Bristol, and filled the office with such distinction that he received a knighthood. Sir Barclay Baron performed much useful work during the early days of the war, especially in recruiting and caring for the wounded soldiers. He will be much missed in Bristol, as he was a man of many attainments, who took a keen interest in all matters connected with the welfare of the city

ROYAL MEDICAL BENEVOLENT FUND.—At the last meeting of the committee held on June 10th 13 cases were considered and £147 10s. voted to 12 of the applicants. The following is a summary of some of the cases relieved:—

Daughter, aged 80, of M.R.C.S. Eng., who practised at Hackney and died in 1859. Applicant is too old to work. She receives £30 from friends and £30 from another charity. Pays 25s. a week rent. Relieved seven times, £96. Voted £15 in 12 instalments.—Daughter, aged 62, of M.R.C.S. Eng. who practised at Long Sutton and died in 1879. Receives £25 from investments. Her employer now dead, but she is looking after the house until the son's return home and she receives no salary. Relieved four times, £48. Voted £12 in 12 instalments.—Daughter, aged 55, of M.R.C.S. Eng. who practised at Box, Wilts, and died in 1894. Has no income. Lives with her sister, who also has help from the Fund. Unable to earn anything owing to ill-health. Relieved nine times, £120. Voted £12 in 12 instalments.—Widow, aged 54, of L.R.C.P. & S. Edin. who practised in Jamaica and died in 1893. Applicant is an invalid. She receives £20 a year from a hospital for incurables, and her eldest daughter helps to pay the rent when possible. Has three daughters, two married and unable to help. Relieved 10 times, £120. Voted £12 in 12 instalments.—Daughter, aged 60, of M.R.C.S. Eng. who practised at Rotherhithe and died in 1879. Was left without means. Only income £4 from investments, and £20 from friends. Pays 8s. a week rent for one room. Suffers from chronic glaucoma. Relieved 10 times, £106. Voted £15 in 12 instalments.—Daughter, aged 58, of M.R.C.S. Eng. who practised in Cornwall and died in 1917. Was left unprovided for. Applicant acts as organist at the parish church, for which she receives £12 per annum, and by teaching music she receives about £12 a year. Pays £13 10s. for rent and rates. Relieved twice, £24. Voted £12 in 12 instalments.—Wife, aged 53, of L.R.C.S. Eng. who practised at Bournemouth. Applicant was deserted by husband many years ago. Has one daughter, who pays her mother all she earns, 31s. per week. Applicant suffers from ill-health. Relieved six times, £62. Voted £12 in 12 instalments.—Widow, aged 52, of M.R.C.S. Eng. who practised at Stalham, Norfolk, and died in 1917. Applicant left without means with four children, two of whom are still at school. Receives £15 a year from late mother's estate. Has just taken a small house at Stalham to take in visitors or permanent boarders. Friends help a little with the children's education. Rent and rates, £17 8s. Relieved twice, £17. Voted £12 in 12 instalments.—Widow, aged 54, of L.S.A. Lond. who practised at Leicester and died in 1910. Applicant was left with four children and now receives £2 8s. per week from the two eldest. Owing to the high cost of living finds it impossible to manage. Relieved seven times, £84. Voted £12 in 12 instalments.

Subscriptions may be sent to the acting honorary treasurer, Dr. Samuel West, at 11, Chandos-street, Cavendish-square, London, W. 1.

THE SERVICES.

ROYAL NAVAL MEDICAL SERVICE.

Surg.-Comdr. (retired) R. Hardie to be Surgeon Captain (retired) in recognition of services rendered during the war.

Surg.-Comdr. E. Arkwright is placed on the Retired List.

To be Surgeon-Lieutenants: G. W. Woodhouse and J. F. M. Campbell.

ARMY MEDICAL SERVICE.

Temp. Col. Sir William Arbuthnot Lane, Bt., C.B. (Captain, R.A.M.C., T.F.), relinquishes his temporary commission on re-posting.

Temp. Major-Gen. Sir Wilmot P. Herringham, C.B. (Lieutenant-Colonel, R.A.M.C., T.F.) relinquishes his temporary commission on re-posting.

ROYAL ARMY MEDICAL CORPS.

Temp. Lieut.-Col. F. C. Moore (Captain, R.A.M.C., T.F.) relinquishes his temporary commission on re-posting.

Majors W. J. Weston and E. B. Booth to be acting Lieutenant-Colonels whilst specially employed.

Temp. Major W. Robertson (Captain, R.A.M.C., T.F.) relinquishes the acting rank of Lieutenant-Colonel.

Major P. C. T. Davy relinquishes the acting rank of Lieutenant-Colonel on re-posting, and is seconded for service under the Egyptian Government.

To be acting Majors: Capt. A. L. Foster; Temp. Capts. W. J. D. Bromley, St. G. E. Harris, E. T. C. Milligan.

The undermentioned relinquish the acting rank of Major: Capt. C. M. Rigby; Temp. Capts. W. Fell, D. I. Anderson, F. N. Brown, R. G. Oram, J. A. W. Watts.

Major F. C. Sampson relinquishes the temporary rank of Lieutenant-Colonel on re-posting.

Capt. W. J. Tobin to be acting Major whilst specially employed.

Captains, from Special Reserve, to be Lieutenants and to be temporary Captains: H. M. Alexander, (Acting Major) D. J. Valentine.

To be Captains: Capt. (acting Major) C. H. Brennan, from Special Reserve; Temp. Capts. W. Frier, M. P. Power.

Capt. H. B. F. Dixon, from R.A.M.C., T.F., to be Captain.

Temporary Lieutenants to be temporary Captains: I. Hodgkinson, A. E. Clarke, C. B. Gervis, A. F. Galloway, E. C. Tatam, G. F. Rigden, H. Sheasby, A. Shearer, E. H. Edwards, C. A. Masson, S. H. Wilkinson, A. P. Green, H. Harrison, F. Shearar, F. H. Alexander, J. H. D. Phelps, R. J. Hutchinson, J. Elder, C. H. Broomhead.

Temp. Lieut. C. A. Whitfield to be Lieutenant.

Capts. A. L. Urquhart, T. D. Inch, C. J. D. May resign their commissions.

Officers relinquishing their commissions:—Temporary Lieutenant-Colonels retaining the rank of Lieutenant-Colonel: A. B. Mitchell, J. C. G. Ledingham; Temp. Major H. H. Sepell (granted the rank of Lieutenant-Colonel); Temp. Hon. Major H. S. Souttar (retains the honorary rank of Major). Temporary Captains granted the rank of Major: W. Anderson, A. C. E. Gray, S. Campbell, P. M. Heath, T. A. Lawder. Temporary Captains retaining the rank of Captain: W. J. Harris, L. D. Callander, R. W.

Eddie, D. Longwill, J. S. Leslie, J. K. Davies, W. W. Carlow, G. V. Anderson, W. Landsborough, H. G. Barrie, H. J. Penny, E. L. M. Lobb, A. H. Thomas, W. Beck, E. S. Ellis, G. F. Fawn, R. Crothers, C. D. Day, R. Frew, T. P. Lewis, J. C. B. Grant, G. S. Applegate, J. Findlay, E. H. H. Granger, C. W. Freeman, G. H. Keene, A. Duguid, D. M. Borland, W. G. Gourlie, F. Brickwell, W. D. Dunlop, J. E. Chee man, J. C. Hallinan, R. J. Bruce, J. D. Benjafield, J. Fairley. Temporary Honorary Captains retaining the honorary rank of Captain: P. D. Spohn, E. V. Jones, L. E. C. Norbury, A. Wills, L. W. Sharp, C. C. Goodall, C. H. L. Harper, C. G. Hitchcock, A. G. Shera, W. Martin, L. M. Earle, H. A. F. Wilson, E. W. Twining, R. H. Campbell. Temporary Lieutenants retaining the rank of Lieutenant: D. M. Young, W. C. Rainsbury, A. B. Earle, A. B. Slater.

Canadian Army Medical Corps.

The undermentioned officers retire in the British Isles: Temp. Maj. W. R. W. Haight; Hon. Capt. C. R. Stewart.

Temp. Capt. (acting Maj.) E. L. Pope to be acting Lieutenant-Colonel while employed in charge of the Medical Section, No. 12 Canadian General Hospital.

Temp. Capt. C. A. Davies to be acting Major while employed with No. 12 Canadian General Hospital.

Temp. Capt. H. B. Van Wyck to be acting Major.

Temporary Lieutenants to be Temporary Captains: J. F. Rocheleau, A. Roy, R. Fontaine, J. A. Mignault, R. C. Lyon, S. J. W. Horne, F. B. Sharp, C. B. Benwell, M. R. Kerr, W. T. Pocock, D. L. MacDonell, V. C. McCuaig, L. W. M. Freele, J. G. Seaton, G. L. McGuffin, J. F. Weir, L. G. Hillier, H. A. McKay, M. R. Boe, S. F. Tichborne.

Canadian Army Dental Corps.

Temporary Captains to be Temporary Majors: R. Jamieson, A. A. Garfat, E. W. Hunsinger, O. N. Leslie, J. W. Hagey.

GENERAL RESERVE OF OFFICERS.

The undermentioned, late Captains, R.A.M.C., to be Captains: T. D. Inch, C. J. D. May, A. L. Urquhart.

SPECIAL RESERVE OF OFFICERS.

Capts. C. S. Staddon and J. A. L. Wilson to be acting Majors.

Capt. A. T. Pitts relinquishes the acting rank of Lieutenant-Colonel on re-posting.

Captains relinquishing the acting rank of Major on re-posting: C. S. Staddon and C. Armstrong.

Capt. G. Dalziel relinquishes the acting rank of Major.

TERRITORIAL FORCE.

Major (Brevet Lieut.-Col.) (acting Col.) D. Rorie relinquishes his acting rank on vacating appointment as Assistant Director of Medical Services.

Major (acting Lieut.-Col.) J. Ward relinquishes his acting rank on ceasing to be specially employed.

Major G. W. Fitzgerald is restored to the establishment on ceasing to hold a temporary commission in the R.A.M.C.

Capts. (acting Lieut.-Cols.) relinquishing their acting rank on ceasing to be specially employed: C. K. Maurice, E. Alderson, H. J. Dunbar (reverts to the acting rank of Major).

Capts. (acting Majors) relinquishing their acting rank on ceasing to be specially employed: H. S. Hollis, H. A. Macmillan, H. J. Dunbar, W. Stobie, J. C. W. Methven, J. M. Pringle, W. H. Manson.

Capt. G. D. Collen relinquishes his commission, and retains the rank of Captain.

Capt. C. P. C. Sargent is seconded for service with the R.A.F.

Capt. J. W. Scott to be acting Major whilst specially employed.

3rd Scottish General Hospital: Capt. J. Gracie is restored to the establishment.

4th Scottish General Hospital: Capt. W. Whitelaw is restored to the establishment.

1st South Midland Mounted Brigade Field Ambulance: Lieut. D. Buchanan to be Captain.

4th Northern General Hospital: Capt. H. C. Barlow relinquishes his commission and retains the rank of Captain.

2nd Western General Hospital: Major G. R. Murray is restored to the establishment on ceasing to hold a temporary commission in the Army Medical Service.

2nd Southern General Hospital: Major C. H. Walker is restored to the establishment.

3rd Southern General Hospital: Major J. A. P. Price is restored to the establishment.

ROYAL AIR FORCE.

Capt. R. C. Fuller is transferred to the Unemployed List.

A. L. Robinson and W. A. Malone (Captain, R.A.M.C., S.R.) are granted temporary commissions as Captains.

Dental Branch.—Lieut. B. G. Kechnie is transferred to the Unemployed List.

BOOKS, ETC., RECEIVED.

LIPPINCOTT (J. B.) COMPANY, London and Philadelphia.
White and Martin's Genito-Urinary Surgery and Venereal Diseases. By E. Martin, M.D., and others. 11th ed. Pp. 935. *30s.*

LONGMANS, GREEN, AND CO., B. QUARITCH, AND DULAU AND CO., London.
Studies on Acari. No. 1, the Genus Demodex, Owen. By Stanley Hirst. Pp. 44, xiii. plates. *10s.*

MACMILLAN AND CO., LTD., London and New York.
Dr. John Fothergill and his Friends. By R. Hingston Fox, M.D. Pp. 434. *21s.*
The Blind. By H. Best, Ph.D. Pp. 763. *$4.00.*
The Newer Knowledge of Nutrition. The Use of Foods for the Preservation of Vitality and Health. By E. V. McCollum. Pp. 109. *6s. 6d.*

MURRAY, JOHN, London.
War. By Ronald Campbell Macfie, M.D. Pp. 71. *3s. 6d.*
Odes and other Poems. By R. C. Macne, M.D. Pp. 135. *5s.*

SIDGWICK AND JACKSON, London.
A Woman Doctor: Mary Murdock, of Hull. By H. Malleson, B.A. Preface by L. B. Aldrich-Blake, M.D. Pp. 231. *4s. 6d.*

UNIVERSITY OF LONDON PRESS, LTD., London.
Health Resorts of the British Islands. By N. Wood, M.D. 2nd ed. Pp. 254. *6s.*

Appointments.

ALLEN, JOHN, M.B., Ch.B. Manch., D.P.H., has been appointed Medical Officer of Health and School Medical Officer for Taunton.

BURROUGHS, A. E., M.B., Ch.B. Edin., Honorary Ophthalmic Surgeon, Royal Infirmary, Liverpool.

DILLON, FREDERICK, M.B., Ch.B. Edin., Clinical Assistant to the Physician for Mental Diseases, University College Hospital.

FITZPATRICK, M.B., B.S., Major, and MCKEOWN, Miss, House Surgeons to the Royal Free Hospital.

JACKSON, W., M.D. Brux., one of the Medical Referees under the Workmen's Compensation Act, 1906, for County Court Circuit No. 11.

LEWIS, EMILY C. F.R.C.S. Eng., Senior Resident Medical Officer to the Royal Free Hospital.

PATERSON, Miss, M.D., Curator of the Museum, Royal Free Hospital.

PHILLIPS, R. E. G., M.R.C.S., L.R.C.P. Lond., Public Vaccinator for Forden Union, Montgomery District.

London Lock Hospital.—ABRAHAM, J. J., F.R.C.S., Honorary Surgeon to Out-patients; BONARD, N. S., M.D., M.R.C.S., Pathologist; JULER, F. A., F.R.C.S., Ophthalmic Surgeon; MAHON, E. M., M.R.C.S., L.R.C.P., Clinical Assistant; SHAW, L. D., M.B., Ch.B., House Surgeon; THOMSON, D., M.B., Ch.B. Edin., D.P.H. Camb., Research Pathologist and Lecturer on Venereal Pathology; WILD, F. T., L.D.S., Dental Surgeon. LANE, J. E., F.R.C.S., and MCDONAGH, J. E. R., F.R.C.S., in charge of In-patients at the Female Lock Hospital (additional).

Vacancies.

For further information refer to the advertisement columns.

Abergavenny, Monmouthshire Asylum.—Jun. Asst. M.O. £300.
Barrow-in-Furness County Borough.—Asst. M.O.H. and Clin. Tuberc. O. £5 0.
Battersea Dispensary for the Prevention of Consumption, 179, Battersea Bridge road, S.W.—Tuberc. O. £500.
Birmingham Children's Hospital.—Surgeon.
Birmingham General Hospital.—H.P. £100.
Birmingham University, Faculty of Medicine.—Prof. of Path. £900.
Bristol City and County.—Asst. Tuberc. O. £450.
Bristol, Ham Green Isolation Hospital and Sanatorium, Pill, near Bristol.—Asst. Res. M.O. £300.
Cardiff, King Edward VII. Hospital.—Four Anæsthetists £75.
Carmarthen Mental Hospital.—Second Asst. M.O. £250.
Charing Cross Hospital, Agar-street, W.C.—Physician, Asst. Surg., and Dent. Surg.
Chesterfield and North Derbyshire Royal Hospital.—Three Hon. Anæs.
Church Missionary Society, Salisbury-square, E.C.—Medical Men and Women Missionaries.
City of London Hospital for Diseases of the Chest, Victoria Park, E.—H.P. £100.
City of London Truss Society, 35, Finsbury-square, E.C.—Asst. S.
Cumberland County and City of Carlisle.—Asst. M.O. £600.
Darlington General Hospital.—H.S. £225.
Derby, Derbyshire Royal Infirmary.—H.S. £200.
Devonport, Royal Albert Hospital.—Res. H.S. £200.
Doncaster Royal Infirmary and Dispensary.—Female Asst. H.S.
Dorset County Council Education Committee.—School Dentists. £350.
Dumfries and Galloway Royal Infirmary.—Res. Asst. H.S. £75.
Durham University.—Asst. in Department of Bacteriology. £500.
East Sussex County Asylum, Hellingly, Sussex.—L.T. 7 gns a week.
East Sussex County Council Education Committee.—Jun. Asst. School M.O. £400.
Elizabeth Garrett Anderson Hospital, Euston-road.—Female Path. £235. Also Asst. Path. £100
Frere Hospital, East London, Cape Province, S. Africa.—Res. M.O. £350.
General Lying-in Hospital, York-road, Lambeth.—Res. M.O. £100.
Glamorgan County Council, Medical Inspection of Children in Schools.—Two M.O.'s. £500.
Gravesend Hospital.—H.S. £200.
Hampstead General and North-West London Hospital, Haverstock-hill, N.W.—Radiographer. £50.
Hong Kong.—Bact. and Path. £600.
Hospital for Epilepsy and Paralysis, Maida Vale, W.—Res. M.O. £150.
Hull, City and County of Kingston upon-Hull.—Res. M.O. £450.
Hull Royal Infirmary.—H.P. £200.
Jura Parish Council.—M.O. and Vac. £300.
Kensington Dispensary and Children's Hospital, 49, Church-street, W.—Res. M.O. £180.
Kent Education Committee.—School Medical Inspector. £362.
King Edward VII. Sanatorium, Midhurst, Sussex.—Med. Supt. £300. Also Pathologist. £400.
Leeds City, Hospitals for Infectious Diseases, Seacroft.—Asst. Res. M.O. £250.
Leicester Royal Infirmary.—H.P. £250.
London Hospital, Whitechapel, E.—Two Hon. Dent. S.'s.
London Lock Hospital, 283, Harrow-road, W.—Registrar.
London (Royal Free Hospital) School of Medicine for Women.—Lectureship in Forensic Medicine and Toxicology
London Temperance Hospital, Hampstead-road, N.W.—Res. M.O. £200. Also Cas. O. £120.
Manchester Children's Hospital, Pendlebury, near Manchester.—Res. M.O.'s £150.
Manchester, Hulme Dispensary.—Hon. S.
Manchester Northern Hospital for Women and Children.—H.S. £150.
New Zealand Public Health Department, Auckland.—Pathologist and Bacteriologist. £700.
Nottingham General Hospital.—H.S. £250. H.P. £250.
Notts County Council. Clin. Tuberc. O. £600.
Oxford City.—Asst. M.O.H. and Sch. M.O. £400.
Queen Charlotte's Lying-in Hospital, Marylebone-road, N.W.—Path. and Registrar. £80. Also Phys. in Charge of Ante-natal Dept.

Royal Free Hospital, Gray's Inn-road, W.C.—Cas. Officer. £100. First H.P. £50. Second H.P. and Anæsth. £50. Female Asst. Obstet. Officer. £50. Also Dermatologist.
Royal National Orthopædic Hospital.—Res. H.S. £200.
Royal Westminster Ophthalmic Hospital, King William-street, W.C.—H.S. £75.
St. Bartholomew's Hospital and College.—Sen. Demonstrators and Demonstrators of Phys., Anat., and Path
Scottish Women's Hospitals.—Female Asst. M.O. £300.
Sheffield, Jessop Hospital for Women.—Sen. and Jun. H.S.'s for Gynæc. and Matern. Depts. £200 and £150. Also Registrar.
Sheffield Royal Hospital.—Asst. Cas. O. £120.
Sheffield Royal Infirmary.—Asst. H.P. £150. Oph. H.S. £150.
Southampton County Borough.—Female Asst. M.O. £400.
Southern Rhodesia.—District S.'s. £375 to £500.
Southwark Union Infirmary, East Dulwich Grove, S.E.—Asst. Med. Supt. £400 Also Two Asst. M.O.'s. £350.
University of London, University College.—Asst. in Phys. Chemistry. £250. Also Sharpey Schol. in Physiology. £200.
Wakefield, Middleton-in-Wharfedale Sanatorium, near Ilkley.—Med. Supt. £500. Also District Tubere. O. for Pontefract area. £500.
West Ham Union Workhouse, Union-road, Leytonstone.—Res. Asst. M.O. £300.
Westminster Hospital.—Med. Registrar and Surg Registrar. £50 each.
West Riding County Council.—School Med. Inspector. £400.
York County Hospital.—Second H.S. £200.

THE Chief Inspector of Factories, Home Office, S.W., gives notice of vacancies for Certifying Surgeons under the Factory and Workshop Acts at Ballymore Eustace, Belford, Maynooth, Randalstown, and Rathvilly.

Births, Marriages, and Deaths.

BIRTHS.

BRAKENRIDGE.—On June 13th, at Rhos-on-Sea, the wife of Colonel F. J. Brakenridge, R.A.M.C., of a daughter.
LOCHRANE.—On June 11th, at Friargate, Derby, the wife of Charles Lochrane, M.D., F.R.C.S.E., of a son.
STEEL.—On June 13th, at the White Cottage, Malvern Common, Great Malvern, the wife of Captain O. W. D. Steel, M.C., R.A.M.C. (T.F.), of a son.

MARRIAGES.

PERKINS–GILL.—On June 14th, at Thorpe Church, Captain George Perkins, M.C., R.A.M.C., to Fanny Blanche, youngest daughter of Alderman Mark Gill, J.P., and Mrs. Gill, of Southsea.
RATCLIFFE—HENDERSON.—On June 14th, at St. Luke's, Chelsea, Cecil Nuttall Ratcliffe, Surgeon-Lieutenant, R.N., to Nina, third daughter of the late John Henderson, surgeon dentist, of Liverpool and Hoylake.

DEATHS.

ALLIOTT.—On June 12th, at Augusta road, Ramsgate, Richard Alliott, M.R.C.S., L.R.C.P., B.A. Oxon., aged 49 years.

N.B.—A fee of 5s. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Medical Diary for the ensuing Week.

SOCIETIES.

ROYAL SOCIETY, Burlington House, London, W.
THURSDAY, June 26th.—Papers:—Mr. A. E. H. Tutton: Monoclinic Double Selenates of the Cobalt Group.—Hertha Ayrton: A New Method of Driving off Poisonous Gases (communicated by Prof. T. Mather).—Mr. F. W. Aston: Experiments with Perforated Electrodes on the Nature of the Discharge in Gases at Low Pressure (communicated by Mr. C. T. R. Wilson).—Mary Seegar and Prof. Karl Pearson: De Saint-Venant Solution for the Flexure of Cantilevers of Cross-Section in the Form of Complete and Curtate Circular Sectors; and on the Influence of the Manner of Fixing the Built-in End of the Cantilever on its Deflection.—Mr. H. Jeffreys: On the Relation between Wind and the Distribution of Pressure (communicated by Sir Napier Shaw).

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.
MEETING OF SECTION.
Monday, June 23rd.
ODONTOLOGY (Hon. Secretaries—F. N. Doubleday, G. Paton Pollitt, J. Howard Mummery): at the Royal College of Surgeons at 5.30 P.M. *Demonstration* by Mr. J. F. Colyer.

The Royal Society of Medicine keeps open house for medical officers of all the Allied Forces, and invites them to make free use of its library and rooms. The Emergency Post Graduate Scheme, under the charge of the "Fellowship of Medicine," is also open to all medical officers. Particulars of this will be supplied by the Secretary, Fellowship of Medicine, 1, Wimpole-street, London, W. 1.

TUBERCULOSIS SOCIETY.
SATURDAY, June 28th.—Annual Meeting. 7.30 P.M., Dinner at the Trocadero Restaurant (charge 10s 6d.). Business meeting to follow.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East.
TUESDAY, June 24th.—5 P.M., Croonian Lecture:—Prof. G. E. Smith: The Significance of the Cerebral Cortex.

HOSPITAL FOR CONSUMPTION AND DISEASES OF THE CHEST, Brompton, S.W.
WEDNESDAY, June 25th.—4 30 P.M., Lecture:—Dr. Young: Mediastinal Tumour.

Notes, Short Comments, and Answers to Correspondents.

HOW TO START, AND HOW TO SUCCEED, IN GENERAL PRACTICE.[1]

BY GEORGE STEELE-PERKINS, M.D. EDIN.

PART I.—HOW TO START.

THE title is, I am afraid, rather an ambitious one, but having been 38 years in practice I think that I ought to know something about the subject.

Preparing for the Start.

Do not be content with gaining only sufficient knowledge to pass your examinations. When you have passed them you only know the elements of your profession, and that is quite insufficient knowledge with which to commence a general practice. Having finished your examinations, you should hold all the senior student appointments at your hospital; you must not be content with being house surgeon and house physician, but you should also hold the senior appointments in all the special departments of medicine and surgery, and thus make yourself proficient in all branches of your profession. You are then thoroughly equipped for treating, or dealing with, all cases that come under your care. You should, for instance, be able to diagnose cancer of the larynx, leaving it to the specialist to remove the larynx where that is necessary. Again, you ought to be able to diagnose cataract and know when it requires surgical treatment, so as to hand it over to the specialist when the proper time for operation has arrived. Also learn to play lawn-tennis, golf, bridge, billiards, or whatever games appeal to you, and among other things do not neglect the noble art of self defence. My reasons for saying this I will deal with later when speaking of "how to succeed."

Four Ways of Starting.

Having thus become fully equipped you are ready to commence general practice, and the question arises, How shall you start? There are four methods: (1) to buy a partnership; (2) to buy a practice with an introduction from the man selling the practice; (3) to buy a practice with an introduction from someone other than the man who had previously had the practice; (4) to put up your plate and start on your own. All these methods have advantages, and all have disadvantages. Which you choose you must yourself determine, as it depends on your own tastes, your own ability, your personality, and partly on your financial position.

I will endeavour to lay before you a few general principles and reasons to guide you in deciding on one or other of the methods.

Buying a Partnership.

As regards buying a partnership. Sum up your man; make inquiries about him and his practice, and do not go into partnership with him unless you think you will get on amicably together. Particularly find out if the practice is a declining one, as, if so, you may be sure there is something wrong—the man drinks, gambles, neglects his practice, does not know his work, or something. You may be sure there is a reason why his practice is declining, and do not join him.

Do not spend a lot of money in buying a share of a large practice, because if the practice is more than the man can do you will not increase the practice much, and therefore your income will not be augmented. Suppose you buy a third or fourth share of a practice, you must arrange that you buy a further share when the practice has increased to some settled amount; you will then have an incentive to work.

Introduction to a Practice.

When buying a practice with an introduction from the man who sells the practice, make sure that the neighbourhood is not going down. Do not buy a large practice—that is, do not spend three or four thousand pounds in purchasing the practice; you will never retain it. A man with a large practice such as that has a personality, is popular, and his traits of character are sure not to be yours; consequently many who liked him will not like you; moreover, many of his patients are sure to have a second string to their bow, and when he retires have made up their minds to what other practitioner they will go, and you will never get them. Sooner or later you have to stand on your own legs, have to succeed or fail by your own personality and your own knowledge; therefore, all you want is an introduction to a certain number of families—the rest depends upon yourself.

[1] An address given at a social evening of the Royal Society of Medicine and here published in an abridged form.

It is usual in buying a practice to have three, six, or 12 months' introduction, and the amount you pay depends on the length of introduction the seller is willing to give you. Roughly speaking, two years' purchase is the maximum, and the shorter the introduction the less proportionately you pay.

Death Vacancies.

As regards buying a practice with an introduction from someone other than the man who previously had the practice. This generally means buying a death vacancy, but sometimes an occasion arises where a man has to retire immediately, owing to an accident or ill-health. The only introduction you can get in this case is from the widow or some relative; therefore the introduction is not so good as when buying a practice where the man himself can give you an introduction. It is, however, a very good way of making a start.

Putting up a Plate.

In the matter of putting up a plate and starting on your own, it is a special advantage if fresh houses are going up all over the place, which means that new families are constantly coming. In my own opinion this is the best way to start; but remember, a great deal depends on yourself—that is, you must be of the right temperament, you must be of an independent nature, able to meet difficulties single-handed, able to hold your own in adversity, and, further, you must find a suitable neighbourhood.

You must remember difficulties frequently occur in partnerships. For instance, if the young partner proves a great success the older man is liable to become jealous, and friction arises; on the other hand, if you are not a success and do not get on, your partner becomes dissatisfied. On the whole, as I said before, I think it wiser for a man to start on his own, or else to buy a small practice with or without an introduction from the man who is selling the practice.

A great deal, of course, depends on the place where you intend to start. It is difficult to get on in a small town or village if you start without an introduction, and therefore it is usually wiser under these circumstances to buy a practice. On the other hand, if you commence practice in a rapidly rising neighbourhood you need not buy a practice, but can spend your money better by waiting a little till your patients come.

However, each man must decide for himself, and must start in the way which is most suitable as regards his own temperament and the locality in which he has decided to practise.

A MEDICAL INSTITUTE AND SOCIAL CLUB FOR NEWCASTLE.

NEWCASTLE-ON-TYNE is rich in learned societies, and for many years the accommodation available for the numerous scientific medical gatherings has been insufficient. Efforts to secure suitable premises have now been crowned with success through the public spirit of Dr. J. W. Smith, of Ryton, who has offered a sum of £5000 to found a medical institute in memory of his son, Dr. J. Wilkie Smith, who died with tragic suddenness some years ago. Dr. Smith's object goes beyond the provision of a suitable meeting-place for medical organisations and aims at creating a rendezvous for the members of the medical profession in northernmost England during their infrequent leisure moments. A committee has been formed to assist in carrying out Dr. Smith's admirable scheme.

THE METROPOLITAN WATER-SUPPLY DURING JANUARY, FEBRUARY, AND MARCH, 1919.

THE year began with an excessive rainfall, the Water Examiner reporting that in January it amounted to 4·50 inches, which is 2·26 inches above the average mean rainfall for that month during the previous 36 years. The average daily natural flow of the Thames increased considerably, and the river water at Hampton, Molesey, and Sunbury was more or less turbid during the whole of the month under review. As might be anticipated, the results of the chemical examination of the raw waters of the New River, Thames, and Lee showed, generally speaking, a deterioration in quality. The filtered waters followed suit, though their bacteriological examination was satisfactory, for whereas 90 per cent. approximately of the samples of the three raw waters contained typical *B. coli* in 1 c.cm. of water, 71·4, 59·1, and 12·7 per cent. respectively of the filtered waters (Thames, Lee, and New River) contained no typical *B. coli* in 100 c.cm. The rainfall was less heavy in February, being 2·81 inches, or 0·79 inch above the average mean rainfall for that month during the previous 36 years. Chemical examination showed an improvement in the quality of the raw river waters, and a similar improvement was shown by the filtered waters, although they compared unfavourably with the averages of 1918. The work of filtration was effective according to bacteriological examination. In March the rainfall was again heavy, being 4·66 inches, or 2·51 inches above the average mean rainfall for that month during the previous 36 years. There was in some respects a deterioration in quality according to the chemical examination of the raw river waters, and the filtered waters gave similar results. Both filtered and raw waters showed worse results (chemically) than their averages for 1918, but the latter contained fewer bacteria than in the previous period. The bacteriological examination of the water as it is supplied to the consumer again proved the efficiency of the purifying plant.

PRIZE-GIVING AT THE LONDON SCHOOL OF MEDICINE FOR WOMEN.

THE prize-giving of the London (Royal Free Hospital) School of Medicine for Women will take place on Thursday, June 26th, at 4 P.M., when Miss Frances Ivens, late chief medical officer at the Scottish Women's Hospital, Abbaye de Royaumont, will present the prizes and certificates. Two scholarships have recently been attached to the school: one bearing the name of Dr. Margaret Todd (Graham Travers), of the value of £37 10s. per annum, tenable for four years; the second, called "The Lieutenant Edmund Lewis (R.A.F) and the Lieutenant Alan Lewis (R.N.A.S.) Memorial Scholarship," of the value of £25 per annum, tenable for four years.

PEPYS ON BLOOD TRANSFUSION.

A CORRESPONDENT sends us two further interesting extracts from Pepys' diary:—

Nov. 16, 1666.—"This noon I met with Mr. Hooke, and he tells me the dog which was filled with another dog's blood is very well and likely to be so as ever and doubts not it being of great use to men; and so do Dr. Whistler who dined with us at the taverne." (Dr. Whistler was Pres. Roy. Coll. Phys. in 1683.)

Nov. 21.—"With Creed to a tavern where dean Wilkins and others: and good discourse: among the rest of a man who is a little frantic, hath been a kind of minister now poor and debauched, hired for 20s. to have some of the blood of a sheep let into his body. They propose to let in about twelve ounces which they compute is what will be let in in a minute's time by a watch."

The experiment referred to by Pepys is described in the "Philosophical Transactions," and was performed by Sir Edmund King, the physician who, by means of venesection, saved the King's life during a fit of apoplexy.

A CORNISH CENTENARIAN.

Mr. William Cock Vivian, of Reskadinnick, Camborne, recently celebrated the 100th anniversary of his birthday.

Communications, Letters, &c., to the Editor have been received from—

A.—Messrs. Allen and Hanburys, Lond.; Mr. R. J. Albery, Lond.; Mrs. V. B. Alvarez, New York.
B.—Dr. R. Blondel, Paris; Col. R. J. Blackham, C.B., C.M.G., C.I.E., A.M.S.; Mr. E. J. Burdon, Lond.; Lieut.-Col Sir J. Barrett, K.B.E., C.B., C.M.G.
C.—Prof. E. P. Cathcart, Lond.; Dr. C. W. Cunnington, Lond.; Conjoint Board of Scientific Societies, Lond.; Mr. C. H. Carroll, Lond.; Dr. F. G. Crookshank, Lond.; Dr. D. W. Carmalt-Jones, Lond.; Dr. E. L. Collis, Lond.; Mr. L. V. Cargill, Lond.; Major W. B. Cosens, R.A.M.C.
D.—Mr. H. Dickinson, Lond.; Dr. S. C. Dyke, Oxford; Decimal Association, Lond.; Mr. F. N. Doubleday, Lond.; Mr. W. Danne, Bristol; Mr. J. Dawson, Lond.; Dr. J. F. H. Dally, Lond.
F.—Dr. J. G. Forbes, Redhill; Dr. C. E. S. Flemming, Bradford-on-Avon; Dr. E. R. Fothergill, Hove; Factories, Chief Inspector of, Lond.
G.—Dr. E. Goodall, Bath; Mr. D. Guthrie, Edinburgh; Dr. A. G. Gibson, Oxford.
H.—Major W. E. Home, R.A.M.C.; Dr. F. Hernaman-Johnson, Lond.; Mr. T. A. Hutchinson, Lond.; Highlands and Islands (Medical Service) Board; Dr. E. Hobhouse, Brighton; Dr. G. T. Hebert, Lond.
I.—Borough of Islington War Memorial Fund, Hon. Sec. of.
J.—Mr. G. Jones, Lond., Mr. M. H. Judge, Lond.
K.—Mrs. M. H. Kettle, Lond.; Dr. E. H. Kettle, Lond.; Dr. Alan Kidd, St. Lucia.
L.—London (Royal Free Hospital) School of Medicine for Women, Warden of; Dr. G. C. Low, Lond.; Dr. C. E. Lakin, Lond.; Local Government Board, Lond.
M.—Medical Research Committee, Lond., Asst. Sec. of; Sir G. H. Makins, C.B., G.C.M.G.; Mr. A. Mary, Paris; Lieut.-Col. S. Mort, R.A.M.C.
N.—National Association for the Prevention of Infant Mortality, Lond.; National Committee for Relief in Belgium, Lond., Hon. Sec. of.
O.—Dr. S. Otabe, Benenden; Col. M. D. O'Connell, A.M.S. (retd.)
P.—Mr. Perkins, Romford; Mr. S. G. Paine, Lond.; Sir John Phillips, M.D., Lond; Dr. W. Pasteur, C.M.G., Lond.; Mr. W. H. Plows, Lond.; Capt. F. Penny, R.A.M.C.
R.—Sir H. D. Rolleston, K.C.B; Dr. J. D. Rolleston, Lond.; Surg.-Comm. H. Resh, R.N.V.R.
S.—Mr. M. Sadiq, Lond; Dr. A. G. Shera, Eastbourne; Mr. M. Stall, Geneva; Dr. E. B. Sherlock, Darenth, Scottish Women's Hospitals for Foreign Service, Edinburgh.
T.—Major J. Taylor, R.A.M.C.; Mr. C. W. J. Tennant, Lond.
U.—University of Glasgow.
V.—Mr. R. M. Vick, Lond.
W.—Dr. C. Wilson, Tunbridge Wells; Dr. C. G. Winter, Lond.; West London Medico-Chirurgical Society, Hon. Secs. of; Dr. J. D. Wynne, St. Faiths; Sir W. Hale White, K.B.E., Lond.
Y.—Dr. R. A. Young, Lond.
Z.—Dr. T. Zangger, Zurich.

Communications relating to editorial business should be addressed exclusively to the Editor of THE LANCET, 423, Strand, London, W.C. 2.